COAL AGE

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EVERY thought, every effort, of every human being is aimed at the accomplishment of something. That something may be good, bad or indifferent, but whatever it is, we one and all earnestly desire that the outcome be successful.

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IT IS FOR THIS REASON, and because the word SUCCESS has such a universal appeal, that coal-mining people have responded so generally to our invitation for co-operation in getting out this special issue of Coal Age. We hope the ethical contributions that follow will furnish much inspiration to our readers, and we sincerely trust that the technical articles appearing this week will increase the sum total of engineering knowledge as it applies to coal mining.

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ABOUT 100 ARTICLES were submitted to us for publication in this SUCCESS issue. A great many were returned as not complying with the rules laid down. Quite a few articles were interesting and valuable, but not adapted for this number, so these will be published in succeeding issues. Enough material was received to fill two or three papers the size of this one; so instead of one SUCCESS issue, we will in reality have a series bearing largely on this most interesting subject. Therefore, if your article isn't among those on the following pages and has not been returned to you, it is being saved for a subsequent number.

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PERHAPS THE MOST COMMON and yet the most important point on which the writers in this issue agree is that success is a relative term; that is, a man may succeed and be a success without having accumulated a great fortune, or without having risen to a position of great power and influence. The critical or turning point in a man's life often hinges upon his individual answer to the query—what constitutes success?

* * *

IT IS A LONG STEP on the road to success if one's philosophy can be reduced to a simple definite form. Shooting at random is a waste of ammunition; we must know what we are aiming to do before we can do it. A man is not a man unless he stands for certain fixed principles, and a fellow is foolish to seek to accomplish that which conflicts with these principles.

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THE ENGINEER ON $200 a month, in the view of many people, is a success if he contributes to the world of knowledge or ideas. These same individuals would view the man of money, whose attainments are mostly of a material or physical order, and who employs the engineer, as less of a success, notwithstanding his wealth. As in most matters of such diverse opinion, the average point of view is perhaps best, and the average man happiest.

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AT ANY RATE, it is a wise Providence that has created different men with contrary ideas. It would be a sad world if we all sought the same goal in the same way. Therefore, it is good that some men overvalue the intellectual, while others overvalue the physical and emotional.

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ONE WRITER HAS SAID that "*success is the product of a man's personality.*" There is no doubt that the measure of success depends on the degree to which we make our personality a factor in human affairs. Expressed in another way, our success is in proportion to the responsibilities we shoulder. Hence, if we would be successful, we should seek responsibility rather than attempt to avoid it. The moment we refuse to carry responsibility, we have taken a strangle-hold on ambition. If ambition is dead how can we find success?

The Meaning of Success

By Berton Braley

Success doesn't consist alone in making money, though the successful man ought to make money. Neither does it consist alone in accomplishing ambition, though the successful man should realize his ambition. Success does not consist wholly of the acquirement of fame, though fame should come to the successful man. Success is a combination of all these requisites, with others.

The mine operator who produces the biggest dividends may not be the most successful operator, because he may be getting his results by gutting a mine, by grinding and gouging his labor and by stinting on replacements and repairs, thus laying up trouble that will wipe away the profits in years to come.

Yet such a man may well acquire temporarily the reputation of success; and that is wrong, because there is nothing temporary about true success. It is too big, too comprehensive, too real to be obliterated from the scheme of things in a day or two or in a year or two.

The truly successful operator or the truly successful executive in any line will make money for his stockholders and himself and add to the world's supply of available wealth, but he will do this with justice to his labor, benefit to his properties and with clear recognition of the fact that in this human world the first duty of a man is to be a decent human being.

After all, that man is the most successful who occupies the biggest place in the hearts of his fellow-men; and it is true that in time this confidence, this trust, this liking of men pays dividends, not alone of peace and comradeship, but of gold. Dispute and contention are the costliest things in the world, and where there is understanding and affection they rarely occur—or last long when they do.

So the success which is rightly won is an enduring comfort and happiness. It is only the success which is wrung from the suffering and the blighted hopes of others that turns to dust and ashes in the mouth.

An Alabama Success

By Henry S. Geismer*

SYNOPSIS—How a seam of coal averaging less than 36 in. in thickness was quickly and successfully developed. Economy in coal consumption. All pumps are eliminated.

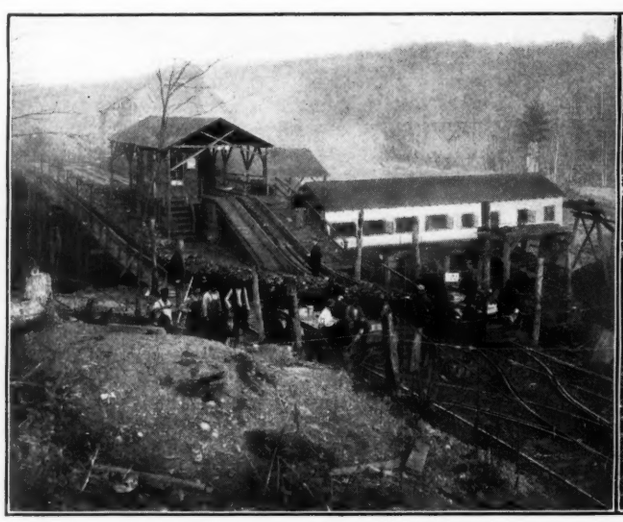
In Alabama there is a mine that loaded its first ton of coal on Aug. 6, 1913. Exactly 366 days later it had reached a daily output of 1100 tons, and by November of that year a daily average of 1223 tons.

There is nothing startling about that until you are told that the seam of coal runs from 32 to 36 in. in thickness, and every employee required to produce that tonnage had to be recruited from camps that had long since passed the experimental stage.

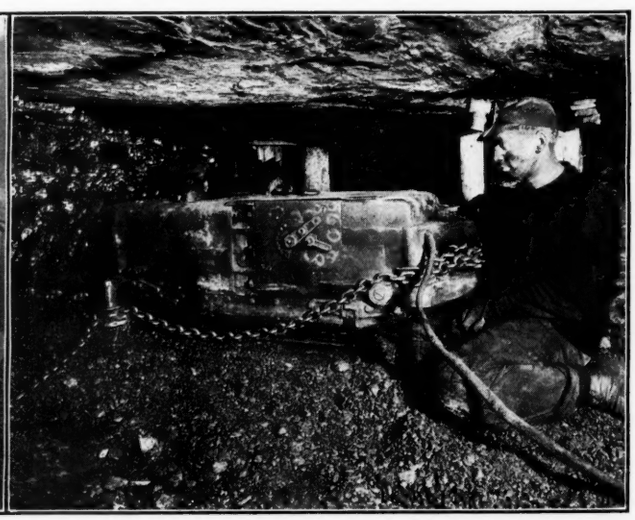
By name it is the Sipsey mine of the Maryland Coal & Coke Co., and it is the only mine owned by this corporation. When it is considered that the organizers of the Maryland Coal & Coke Co. took possession of a tract of land six miles from a railroad, in a veritable wilderness, and across a river at that, and then discovered that it held a thin seam of coal, it seems remarkable that it has a mine at all.

Possibly the fact that Henry T. DeBardeleben and Milton H. Fies were the moving spirits behind the Maryland Coal & Coke Co. is sufficient explanation of its remarkable accomplishments. The first is a son of the most famous

*Consulting engineer, Birmingham, Ala.

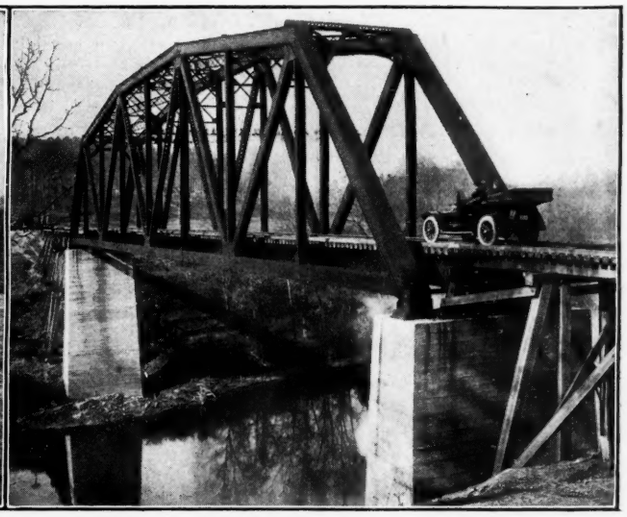


The Sipsey Mine Tipple

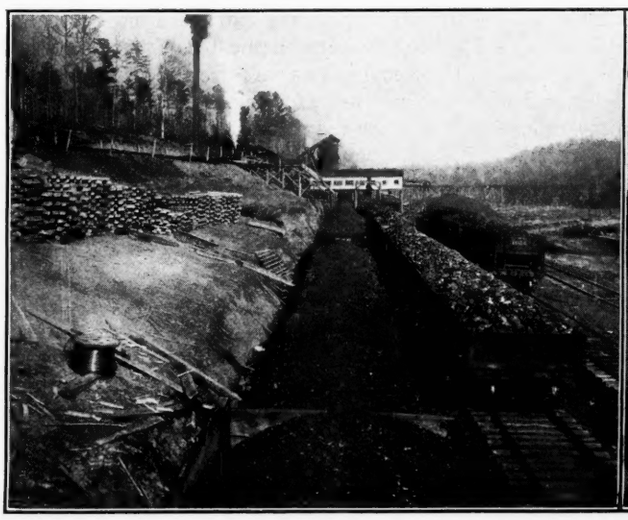


One of the Sullivan Ironclads

The Miners' Houses

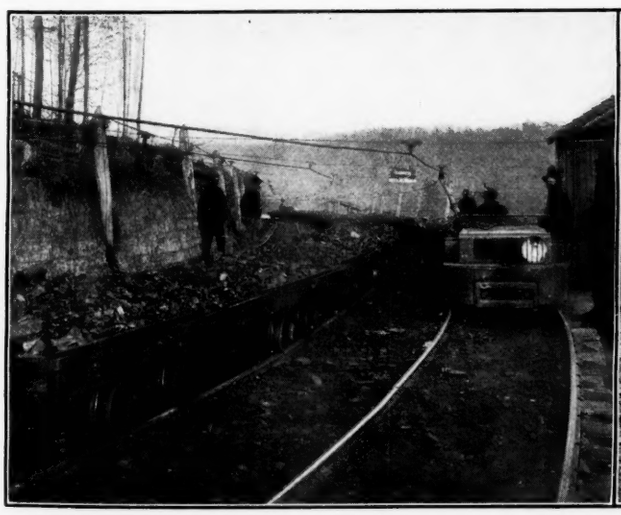


Steel Bridge over River

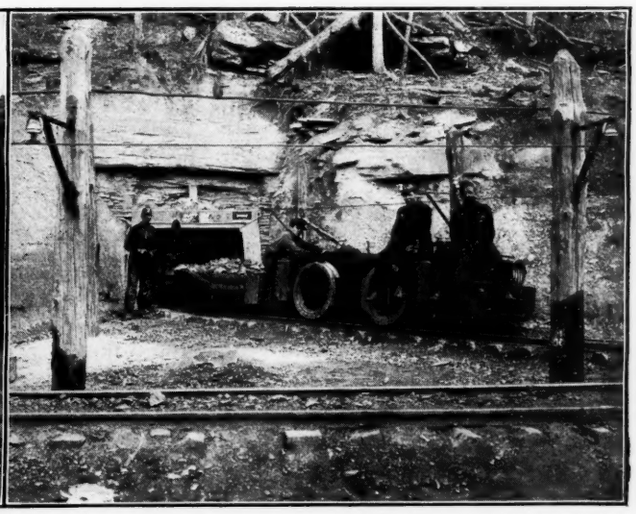


Coal Ready for Shipment

Loading Boom



Two Trips Enroute to Tipple



Locomotive Coming out of Drift Opening

mineral developer in Southern history and a son who was not willing to be known to posterity simply as a great man's son. The second is a Columbia School of Mines graduate who was not afraid to work as a rodman a year or so just for experience, notwithstanding that his father was well able to keep him in spending money.

A Real Accomplishment

If you should ask these two very young men to explain to you how they have been able to develop a mine (the first mine they have been financially interested in together) in a wilderness and keep it running at a maximum output to a minimum of five working days a week during such a winter as we have just passed through, they would in all probability shake their heads, but if by chance they should invite you to go out to the mine and judge for yourself, this is what you would see: A drift mine in which all of the cutting is done by Sullivan electric chain machines, all of the hauling done by electric locomotives, all of the ventilating done by means of motor-driven fans, all slack coal washed in an electric driven washer and all of the necessary power for the entire operation furnished by two 175-hp. boilers.

They burn only 0.9 ton of coal for their own use in producing each 100 tons of coal. Can you beat that? Wait! There isn't an inside pump on the job. That's what these men have done for themselves.

And while they have been doing all this, Uncle Sam has been busy also, and now in less than one year the terrible river that frightened all of the previous investigators will be made navigable, and the Maryland Coal & Coke Co. will be able to load coal upon its own barges and start them off to the Gulf of Mexico.

If you want to observe Mr. DeBardeleben and Mr. Fies overflowing with gratitude just ask them why they were so determined to risk their future in such an apparently unpromising field.

"Did you ever burn any Sipsey coal?" they will say, and then if you reply in the negative they will add, "Well just burn some and you will understand."

This is a pretty good illustration of the possibilities of David Crockett's favorite proverb, "Be sure you're right, then go ahead."

But just a word of warning to those who are inclined to jump at conclusions and who might be tempted to take Mr. DeBardeleben and Mr. Fies at their word. There are several mines in Alabama on this same Black Creek seam of coal the write-up of which would appear ridiculous in a Success number of any paper other than a comic weekly, and that in spite of the fact that they were not six miles from a railroad when they were discovered.

Perhaps their workings have not been as carefully planned in advance, their mechanical equipment not as wisely chosen, their coal not as well prepared at their tipples and their product not as intelligently marketed; at any rate, they were sure they were right, but they didn't go ahead.

The Way to Success

By Ernest Marshall*

It is through the working of a law that success comes in any business or undertaking. Chance plays no part whatever, for in the operation of nature's laws there is no such thing as chance or accident. Man and his fortunes are no more the things of chance than is the tree from its earliest growth. He is the product of the elements and is produced through the working of a law.

First, then, we will state that your thought, or spirit, is your real self and not your body. Thought is an invisible substance and acts apart from your body, moving and influencing others. This thought acts at all times, whether sleeping or waking. Therefore, thought is your real power, and as you learn how it acts, how to hold it, use and control it, you will become successful in that you will be able to accomplish what you set out to do.

Self-control, concentration and clear thinking are the elements that make for success. Your prevailing mood or your frame of mind has to a great extent a direct influence and effect on your success or failure in any undertaking. Whatever of thought you think or receive you send from you again as an invisible substance to act on others. Therefore, it is the kind of thoughts which you create and which you send out that produce a favorable or unfavorable effect on others. Thus it can be said that when determined thought meets determined thought and unites on a similar purpose, a double power for success comes of such union.

Further, carrying out this idea, we can say that thoughts attract thoughts of like kind. By keeping any certain thought fixed in your mind—such as for instance the thought of strength or health—the more of that thought element is attracted to you. Keep in mind the idea of force, go-ahead push, aggressiveness, stick-to-it-iveness, and you attract to you the elements which give you these qualities. Right thinking, serenity, self-confidence, determination, are the qualities we must aim to acquire in order to bring success. Whenever you think, you are affecting your fortunes for good or ill, all depending on the kind of thoughts you create and the impression they make on others. Every thought, whether silent or spoken, has real value.

Determination

If you fix in your mind a persistent determination to succeed in any kind of business you are engaged in, a process of thought construction, or unseen element to draw assisting forces to you, is begun. Let us further explain what is meant by "assisting forces"—first, ever-growing fertility of mind to breed new plans for pushing your business; and second, drawing you to the best people to aid you in working out your plans. To best gain this power we would say that silent, persistent resolve in your mind to do what you set out to do will do the work, and it will do it if you persevere in holding to this frame of mind. To think persistently that you can accomplish a thing, to push hard on your one aim and purpose, will create for you a power which is certain to produce results, if you keep but the one purpose in your mind at a time.

*Roscoe, Penn.

You will never find success in any profession until you seek for it within yourself. It is what you feel, what you think and what you do—not any one of these, but all of them—that help you to attain success. You may do all that the situation requires, but if you have no personal feeling in the matter your deeds will be almost barren of results. Have but one purpose at a time; there is no business in which you will succeed if you divide your interests. Too many "irons in the fire" speak failure, and it is usually attributed to "bad luck" by the victim. A great many of the failures are caused by the victim dabbling in too many things at one time, which takes a man's mind off his business and divides his energy. Many men belong to a class that are still more hopeless than the proverbial "fools," who will learn in no school but that of experience.

I do not wish it to be understood to say that you must have but one interest in life, but that you must have but one interest at a time in order to attain the goal of success. The laws of nature are changeless; the law of mind over matter, if closely followed, is bound to bring you that much-longed-for success. Think of one thing at a time; put all your mental, physical and spiritual strength into the accomplishment of the project you have at hand. Be direct and send your thought as straight as an arrow to the target of your desire. Don't swerve from your purpose to accomplish what you set out to do, and success is yours.

Success lies in you, and you only. When you come to an obstacle in your path to success, do not try to go around or climb over it or wait for it to move out of your way, but boldly put your shoulder to the wheel and push it away. Every person should strive with all his might to overcome the three principal obstacles to success, which are—discouragement, delay and hard knocks. One might just as well ask another man to walk for him as to ask someone to help him to success.

Depend upon yourself and go at anything you undertake determined to win and don't give up.

There is much inspiration in Herbert Kaufman's words:

Success is not for those who quail;
She gives her most to those who fail,
And then with courage twice as great
Take issue once again with fate.
'Tis better far to risk a fall
Than not to make attempt at all.

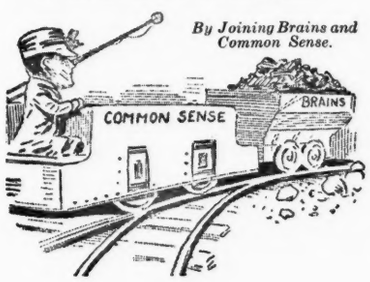
The Secret of Achievement

By Michael Bernard

Written Expressly for COAL AGE

WHEN he was young he learned by heart
Those proverbs, maxims, saws and rules
That formed a necessary part
Of teaching in the older schools.
He followed all their sage advice,
Was punctual as day or night,
Persistent, patient and precise,
Unostentatious and polite.

But though he toiled with all his strength
And humbly did his honest share,
The firm conviction grew, at length,
He wasn't getting anywhere;
For still his job remained the same
As that on which he first began,
Until the resolution came
To modernize his working plan.



By Joining Brains and Common Sense.

The Firm Conviction Grew.

And so he purged his ancient creed
Of all that made it blind and dead,
And from restraint and error freed,
He plugged away, but used his head.
He found success was never gained
By plain, untiring diligence,
But that this object was attained
By joining brains and common sense.

The sneers of some were faintly hid,
While others branded him a fool,
Because, in everything he did,
He followed close the golden rule;
But when the miracle was wrought
And he had gained the laurel crown,
His joy was heightened by the thought
That he had dragged no brother down.

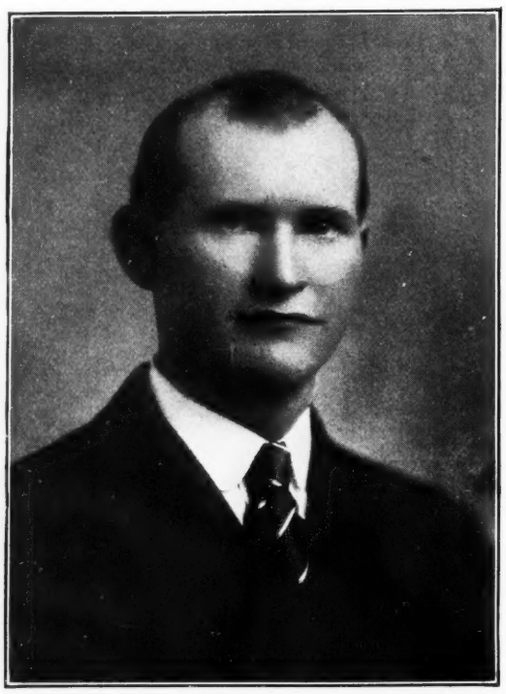
FOR PROGRESS *isn't plodding, nor tenacity, nor pains;*
Success rewards the man who tempers energy with brain.
And he who spurns his mind and on his brawn alone relies
May well expect to be a slave until the day he dies.

John F. Meagher

How would you like to be general superintendent of coal mines for the largest industrial concern in the South and still be only thirty years old? Wouldn't it make you feel that the mining game wasn't so bad after all? Below is the likeness of the man in this position—John F. Meagher, of Pratt City, Ala., who for three years has been general superintendent of coal mines for the Tennessee Coal, Iron & R.R. Co., in charge of six or eight divisions embracing 18 or 20 mines.

There is a story, you know, about a man who left his own home and went into a foreign country to seek diamonds. Unsuccessful there, he came back home and found a big one in his own front yard. This is true in some degree of Mr. Meagher. You will see later that he once took a little side trip, only in this case he not only found the diamond on his return, but the other fellow found one too.

The famous Georges Creek Coal Basin in Maryland furnished the coal-mining industry with the subject of this sketch. He was born at Lonaconing, in Allegany



Mr. Meagher of Alabama

County, on Jan. 2, 1882. In 1887, when he was five years old, his parents moved to Pratt City, his father going to work in the mines, and later serving as mine foreman for a number of years.

In 1898, when he was sixteen years old, Mr. Meagher graduated at the Pratt City high school. Later he took the civil-engineering course of the International Correspondence School of Mines.

Early in life, Mr. Meagher gave evidence of the untiring energy and abundant capacity he possesses for work, and during school vacation in 1894 he got the permission of Samuel Allsop, then foreman at the old Drift Mines of the Tennessee Coal, Iron & R.R. Co., to go to work as a hand pumper. The first day he worked in water up to his waist and the next day he could hardly get out of bed, but he stuck to the job and in a few days found it too easy, so he helped his father mine and load coal.

In the fall of 1895, he started in the engineering department of the Pratt Mines Division of the Tennessee Coal, Iron & R.R. Co. as extra rodman and worked at this during his school vacations in 1896 and 1897. As soon as he graduated from high school in 1898, he accepted a regular place as rodman and worked up to transitman in 1902. In the meantime he was burning the midnight oil taking a course in civil engineering.

In March, 1903, he listened to the siren and took the little side trip mentioned above, accepting the position of division engineer of the southern district for the Weaver Coal & Coke Co., of Chicago, with headquarters at Duquoin, Ill. But the call of the Pratt mines and Village Creek water was too strong and in September of the same year he returned to become assistant division engineer of the Tennessee Coal, Iron & R.R. Co.'s Pratt Division. In the early part of 1905 he succeeded H. S. Geismer as division engineer. In these positions Mr. Meagher acquired an intimate knowledge of the mines and began to develop the qualities of management which have led to his present success.

In May, 1906, he was promoted to assistant superintendent of the Wylam Division and on July 1, 1907, was transferred to Whitwell, Tenn., as superintendent of that division, a position which he held with marked success until December, 1910, when he resigned to become superintendent of the Mulga mine of the Birmingham Coal & Iron Co. In November, 1911, he was promoted to general superintendent of coal mines for the latter company, which place he retained until May 1, 1912, when he came back home, so to speak, and accepted the position of general superintendent of coal mines for the Tennessee Coal, Iron & R.R. Co., with headquarters at Pratt City.

The frequency with which promotions have marked his course is of startling interest in reviewing Mr. Meagher's career. But when those who know him best from experience and association with him relate incidents concerning his ability to handle men and emergencies, the reasons for his success become evident. As for the men who have worked under him at various points, they are a unit as regards their loyalty and firm faith in "John," as he is known to them. It is a characteristic quality of Mr. Meagher that in meeting emergencies he first deals with the conditions, adjusts them, gets everything going right again and then ascertains the cause of the trouble. Questions are easy to answer when they are put at the right time and in the right way. He has a keen knowledge of what constitutes a day's work for a man in the mines, and it is doubtful if he has an equal in this line in Alabama. His practical knowledge of the engineering end of the mining game stands him in good stead, and this, coupled with natural talent for the mastery of every detail of his work, makes him an invaluable man.

Mr. Meagher takes keen interest in "Safety-First" work and has always been among the first to reach the scene and get in the thick of things when trouble occurred at any of the mines in the district. He is prominent in the "Safety-First" work of his own company.

Success can fairly be attributed to John F. Meagher, and there's not a man who knows him who is jealous of the fact, so unassumingly does he carry his laurels and exercise his authority.

Electrification of the Small Mine

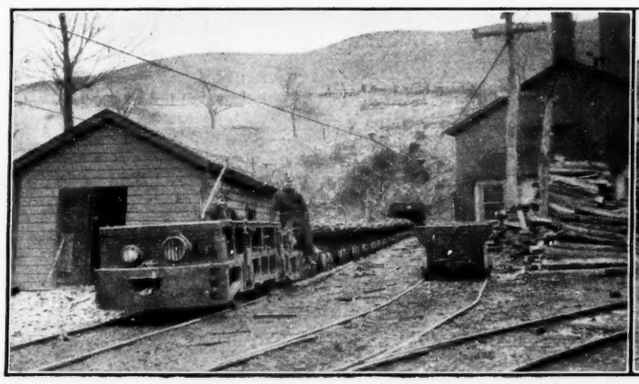
By F. J. Foley*

SYNOPSIS—An actual instance where the installation of electrical equipment and the purchase of central power reduced the power cost from 7c. to 4c. per ton of coal produced.

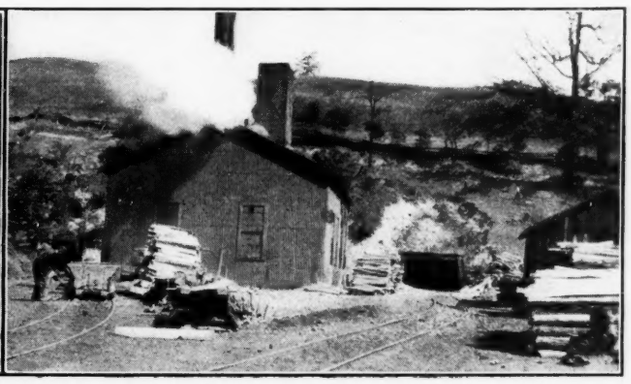
When we look upon the application of electricity to coal mining as it is today, and remember how comparatively recent is its adoption, there are many things for which the coal operator can feel thankful.

As late as 1880 little or no machinery of any kind was used. The first use of electricity in the production of coal of any significance was in 1890, when the electric coal cutter was first put in service.

Coincident with the original application to cutting, an electrically driven haulage locomotive was put in service. At that time most of the work about the mine, such as pumping, hoisting, ventilating and tipple work, was done by steam. It is interesting to note the increase in production since the adoption of electrically driven machinery.



Mouth of Mine, Showing Trip of Loads



The Old Steam-Power Plant, Since Replaced

In 1890 the entire production of coal in the United States was 160 million tons. In 1914 it reached the highest mark, 570 million tons. This production would never have been possible without electrical machinery.

For a very long time coal producers, particularly the small operators, kept little or no record of their costs for power. The trend of thought seemed to be that the coal is here ready for use and it costs so much per ton to mine, therefore power costs and cost of coal used are the same. The machinery was inefficient, the cost of maintenance high and the cost of labor both for power-house attendants and miners had an upward tendency, while at the same time the market price for coal had a more or less downward trend.

Consolidations Have Been Beneficial

Conditions have changed very materially in the last few years. A number of smaller companies have consolidated, forming large combinations, the production and operations of which are so great as to make it possible for them to effect many economies not open to the small producer. For example, the use of a large central plant concentrates the total power in use by a dozen or more mines, and as a result produces power at about 60 per cent. of the total cost of that produced by individual plants.

This condition made it a difficult matter for the small operator to compete in the open market and live, and naturally he began to look for the answer. I have made many tests on small individual plants operating on the basis of 100-kw. to 200-kw. demand and, due to various causes, have found power costs varying from 5c. to 15c. per kw.-hr. There were many cases worse even than this, but the most unfortunate part of the whole situation was the fact that the operators were not keeping any records of cost on their power plants. There was no depreciation account, and worn-out plants 10 to 15 years old were placed on the books as assets valued at purchase price paid 15 years before.

The coal used in boilers by small companies was charged against power cost, not at the price for which it could be sold in the market, but at the *mining cost.* One of the first things to do was to prove the fallacy of this system of accounting. The work that the central station has done along this line is well known.

When the question of changing over to purchased power was brought up, the question of cost of attendance was always vital. It is a difficult matter to get high-class electrical help to stay at a mine unless well paid; on the other hand, the small mine cannot afford to pay for this class of help. As a consequence machinery was required which would operate continuously with a minimum amount of attention and repairs.

One of the most expensive commodities today is skilled labor. The machinery designed and built to operate without attendance saves just the amount of the attendant's wages, and usually is so built that little or no repairs are needed.

The Logansport Coal Co., located on the Buffalo & Allegheny division of the Pennsylvania R.R., at Logansport, Penn., has a capacity of 500 tons per day. Formerly it was operated entirely by compressed-air cutting machines and mule haulage. This system cost on an average 7c. per ton for power, not including upkeep.

In addition to this the air machines and steam engines being of the reciprocating type had many wearing parts,

*Engineer with Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penn.

and it was necessary to be constantly repairing them and nursing the equipment along.

About a year ago this company signed a contract for electric power with the West Penn Electric Co., and alternating current now is delivered to the plant at 2200 volts, 3-phase, 60-cycles. The mine has been completely equipped with electrical apparatus. The trolley and feeder construction and the rail bonding were given careful attention.

To digress briefly, this brings out a point in favor of central-station power for the smaller operator. When he makes an improvement in trolley construction or feeder system and bonding, the results are shown directly on the power bill.

Details of Operation

The cutting machines and locomotives operate at 250 volts direct current, and to get this voltage a converting station was placed about 200 ft. from the drift mouth. This station contains one 150-kw., self-starting synchronous motor-generator set—3-phase, 60-cycle, 2200-volt on the alternating-current end, and 250-volt no-load, 275-volt full-load on the direct-current end.

The fields of the synchronous motor are wound for 250 volts, and the exciting current is taken from the direct-current end of the set, thus eliminating the 3½- to 4-kw. exciter used on other types. The exciters on small sets have been responsible for a large percentage of the trouble which made attendance necessary.

There is a two-panel switchboard consisting of a synchronous motor panel, with a double-throw starting switch equipped with no-voltage and overload release. This acts as a circuit-breaker against both overload and failure of current supply. There is an overspeed device on the motor-generator set which will open this breaker should the set, for any reason, exceed a safe speed. In addition, the panel is equipped with a power-factor meter and an ammeter. The direct-current generator panel is equipped with a voltmeter, ammeter, circuit-breaker and switches.

This class of substation was designed especially for coal-mining work, is simple in construction and operation and needs very little care and attention. The locomotive motorman has started the particular set described every day for a year at 7 o'clock in the morning and left it to run without attention. A unique arrangement used at this mine is a lamp shunted across the trolley and ground where it can be plainly seen from the blacksmith shop, which is about 100 ft. from the substation. If the circuit-breaker goes out while the locomotive is inside the mine, the blacksmith or his helper resets it. This set has operated without shutdown for repairs for a year. At the time of my visit the commutator had not been cleaned since the installation, and commutation was perfect.

The locomotive shown in the accompanying illustration is a 10-ton Barsteel type, with two 50-hp. commutating-pole motors, steel-tired wheels and arc headlight. This machine has hauled coal from the day it was received until the visit mentioned without having lost one minute's time. The motors are equipped with bronze-sleeve bearings for oil and waste lubrication. They have never been inspected. This locomotive was guaranteed to haul 34-car trips; it has often hauled 50- and 52-car trips without the least effort.

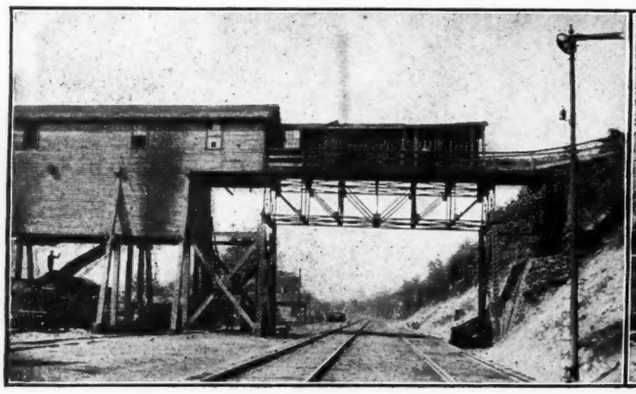
The fan is driven by a 50-hp., 3-phase, 60-cycle, 2200-volt squirrel-cage induction motor, equipped with hand starter.

Benefits of Central-Station Power

There are many other applications of smaller size that have shown up just as well as the larger equipment. This installation and many others like it spell success for the mine owner because they are absolutely trustworthy. They can be started and left to do their work. The worry and care of power supply are taken out of the coal operator's hands by using central-station power. The worry and care of plant operation are removed by using properly designed electrical machinery, and he is left free to attend to his own business, which is the mining of coal at a cost that spells profit.

The mine, the plant and the men at Logansport all bear the same mark, "on the job." Mr. Turner, superintendent of the mine, is justly proud of his model plant, and this pride is reflected by his men, who all work to get the most out of their machines and to keep them in good shape. The plant is well laid out and installed and will give good service for many years to come.

This plant—what it is and what it has done—is an excellent example of successful engineering, because the primary object of the engineer is to accomplish results in the most economical way. By making the installation above described, the power cost was reduced from 7c. to 3c. per ton; there are also low maintenance charges and almost a complete elimination of attendants. The company may well be proud of results such as these.



Logansport Coal Co.'s Tipple

10-Ton Westinghouse "Barsteel" Locomotive

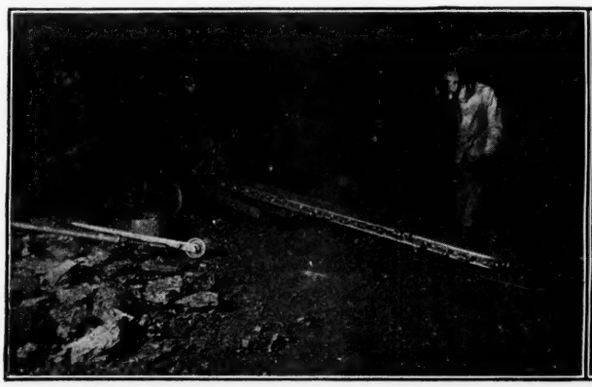
Deep Undercutting with Mining Machines

By R. A. Lowry*

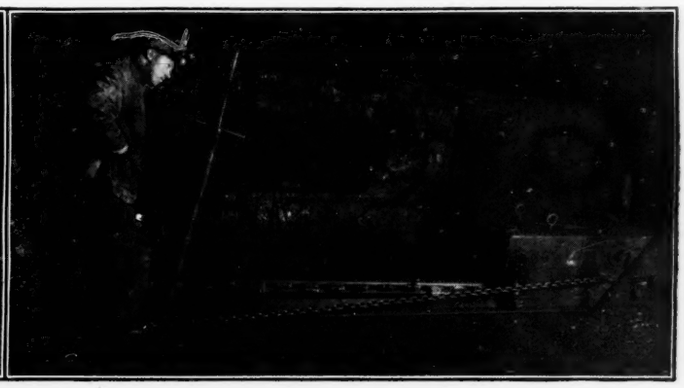
SYNOPSIS—The substitution of 10 ft. 4 in. cutter bars on coal undercutters in place of the 5½-ft. to 6½-ft. bars ordinarily employed results, under the conditions prevailing in southern West Virginia and western Virginia, in many advantages.

The use of mining machines as a substitute for the pick in undercutting coal or, in later days, as an alternative to "shooting off the solid," will be acknowledged by all readers as one of the most important improvements in coal-mining processes.

The compressed-air "puncher," the chain breast machine and now the continuous-cutting chain type of undercutter electrically or air driven have rendered mining more successful in safety, in rapidity of production and in economy. Another step in advance, made with the Ironclad cutter, is the employment of cutter bars longer than was formerly considered practical.



Unloading Machine from Truck



Ready to Start Sumping Cut

It used to be an accepted theory that coal of average height could not be shot successfully to the back of the cut when this exceeded one and one-third times the height of the face; or, in the case of thick seams, when cut to a depth greater than the height of the face. A standard maximum length for the chain-machine cutter bar has been, for several years past, 6½ ft.

About two years ago, Edward O'Toole, general superintendent of the United States Coal & Coke Co. at Gary, W. Va., came to the conclusion that with clean coal, free from sulphur and other impurities that hinder shooting, with strong roof and even bottom, coal could be undercut and shot successfully to considerably greater depths.

At his request, the Sullivan Machinery Co. made up Ironclad coal cutters with bars 8 ft. 6 in. long and then, as these proved successful, machines with 10-ft. 4-in. bars.

The performance of these machines at Gary was watched by the management with great interest. After a thorough test, the following results were evident. Comparing the 10-ft. 4-in. bar with the 6-ft. 6-in. bar, the longer bar cut 64 per cent. more coal in the same places, cost only about one-third more for labor and power, required fewer repairs per ton, produced a larger percentage of lump coal, and required less powder per ton in shooting.

Moreover, the progress of development is materially increased by the long-bar machines. An average advance of 160 ft. was made with 6-ft. 6-in. bars per month working single shift, while 250 ft. is an average for the 10-ft. bar during the same period.

The long cutter bar Ironclad machine is also used at the mines of the Clinchfield Coal & Land Corporation, at Dante, Va., mining the "Upper Banner" and "Lower Banner" seams, in Virginia correlation.

The "Upper Banner" is a woody, friable coal with comparatively well pronounced faces and butts, averaging 5 ft. in thickness. The top is sand rock and the bottom comparatively hard fireclay. The "Lower Banner" seam will average not over 3 ft. 6 in. high, and is more blocky, with a slate top and fireclay bottom.

These mines had been equipped with machines of several makes; but Mr. Lee Long, the general superintendent, became convinced that deep undercutting was adapted to his coal. He gave the Sullivan machine with 10-ft. 4-in. bar a thorough trial and was so pleased with the increase in over-all efficiency and economy shown that he later replaced many of his older machines with these long-bar Ironclads.

Deep undercutting at Dante has proved a decided success from several points of view. The machine runners were formerly paid per face-foot of undercut, but with the installation of the long-bar machines they were paid a stated price per place, a difference in the rate being made for wide and narrow work. This resulted in an increase in the earning capacity of the runners and a decrease in the cutting cost.

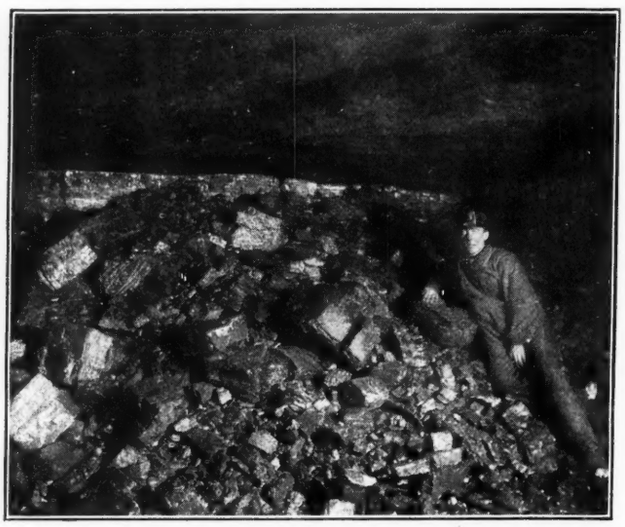
Actual performance in these mines shows that runners familiar with handling the long-bar machine get approximately the same face footage per shift as with the 6-ft. bar machine. Each machine has an assigned territory of 22 to 25 rooms. Since more coal is secured per cut than formerly, it is necessary to cut each place only every other

*841 Court St., Huntington, W. Va.

night. In the 5-ft. or 5½-ft. coal, one cutting provides a loader with two full shifts' work, so that with an adequate car supply he may work continuously at his greatest efficiency. This efficiency is seldom attained in coal of any height with shorter cutter bars.

The Kerf Is Thoroughly Cleaned

When the undercut is finished, the loader takes care that his kerf, which is 5½ in. high, is thoroughly clean. A 7-ft. auger is then used to drill two holes (in rooms) 6 ft. deep and about 3 ft. from each rib. A center hole, 7 ft. deep, is also drilled, all three straight in from the face. Twenty-two inches of black powder is loaded at the back of the center hole, and 18 in. in each rib hole. The center is fired first as a pull or break-down shot, and breaks clear to the heel of the cut. The rib shots break 6 to 7 ft., so when the coal has been loaded out after the first shooting, about three feet of coal is left standing on each rib, with the center clean. One light shot at each rib then turns the standing coal over and squares up the place.



Coal Shot Down Ready to Load out

The "Lower Banner" seam has lent itself to deep undercutting with even better results, although it is only 3 ft. 6 in. thick on an average. There is a pronounced cleavage plane about 18 in. from the bottom in this coal, and when undercut to a depth of 10 ft., the lower part of the seam drops down over the kerf, thus enabling the loader to pull the remaining 2 ft. of coal with very light charges of powder. At present, all coal from these machines is loaded as "screened run-of-mine" and "slack," but the management estimates that the long bars give them an increase of 12 to 15 per cent. of lump that will go over a 4-in. screen. A modern three-track tipple with shaker screens is now under construction.

The Ironclad machines, equipped with these 8½-ft. and 10-ft. 4-in. cutter bars, differ from standard machines using 5½-ft. or 6½-ft. bars in no other particulars. The motors, gearing, friction feed mechanism, etc., are identical. These machines will cut either from right to left or left to right. They are furnished with a reversible cutter chain composed of drop-forged, high-carbon steel links with substantial blocks arranged to give the bit 9 positions in the chain and with setscrews in both sides of the links.

The conclusion reached from studying the results of several installations, particularly those of the United States Coal & Coke Co. and the Clinchfield Coal & Land Corporation, is that deep undercutting is a decided success, and where consistent with the mining conditions, nature of coal, etc., should be recommended since it reduces (1) first cost of machine installation, (2) powder consumption, (3) cutting cost per ton. Moreover, where a certain output is expected, deep undercutting should reduce the territory under development. This is an important feature when the maintenance of roads, ventilation, and supply of timber are taken into consideration. Furthermore, it should increase the percentage of lump and give the loader a more definite or dependable quantity of coal down, thus increasing his efficiency, and thereby raising that of the entire plant.

A Successful Roller-Bearing Mine-Car Wheel

Prior to 1908 there were no successful roller-bearing mine-car wheels on the market commercially. Many such wheels had been tried, but had proven unsuccessful. During that year the Sanford-Day Iron Works, of Knoxville, Tenn., placed on the market its roller-bearing mine truck, which was built with a floating axle and various other improvements differing radically from its predecessors.

During 1913 another step was made. After five years of experience, the above named company was able to produce an improved design of roller-bearing wheel, which was called the "Whitney Wonder." On this wheel the manufacturers are willing to place a five-year written guarantee, not only covering the wheel itself, but also the roller bearing. This wheel is fool proof and requires no attention other than greasing at intervals of from 6 to 18 months.

Upon actual test, this wheel has doubled the speed of motor haulage and saved 58 per cent. of the electric power consumed, in comparison with a solid-hub wheel working under similar conditions. This test was made by the engineer of the Virginia Iron, Coal & Coke Co., at Tom's Creek, Va.

The condition of test and results were as follows: Twenty-car trips, one equipped with "Whitney Wonder" wheels and one with solid-hub wheels, were moved by one motor three times over a distance of 3250 ft. and return. Each car held 3 1/10 tons of coal, and the best time possible was made for each trip. An average of 36 electrical readings was made during each trip, and the voltmeter and ammeter readings were checked with a wattmeter. With the solid-hub wheels, sand was necessary for the track, but was not required with the roller bearings.

AVERAGE FOR THREE TRIPS

	Solid Hub	"Whitney Wonder" Wheels
Time	14.9 min.	7.5 min.
Average amperes	178	154
Average volts	470	465
Average kilowatts	83.78	71.81
Average kilowatt-hours	21.0	8.8

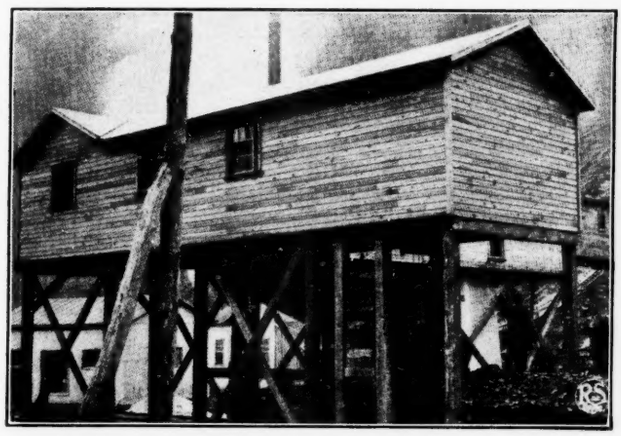
The above test shows a consumption of 21 kw.-hr. per trip for the solid-hub wheel, and 8.8 kw.-hr. for the roller-bearing wheel. This is equivalent to a saving of 58 per cent. in haulage power. Combined with it is a saving of 50 per cent. in the time of haulage. What these savings may mean in the daily output of a mine will be at once appreciated by those who have had experience in mine operation.

Standard Coal Preparation

By Raymond G. Lawry*

SYNOPSIS—In most localities in the Middle West the grading of coal into four sizes is sufficient for all commercial requirements. Simple and effective means may be employed to secure this preparation.

In opening a new mine, the kind and amount of preparation to be given the coal is undoubtedly the most important single item to be considered. The operator usually knows in advance the principal characteristics of the coal which he intends to work and sell. He knows whether it is hard or soft, the nature of its fracture, whether it contains impurities, their kind and amount, and he also has a fair idea of how these impurities occur in the measure, and the process involved in their elimination so as to obtain the most satisfactory product. An experienced coal man is also well aware of market conditions at the time of opening a new mine and knows how to meet them in selling the coal.

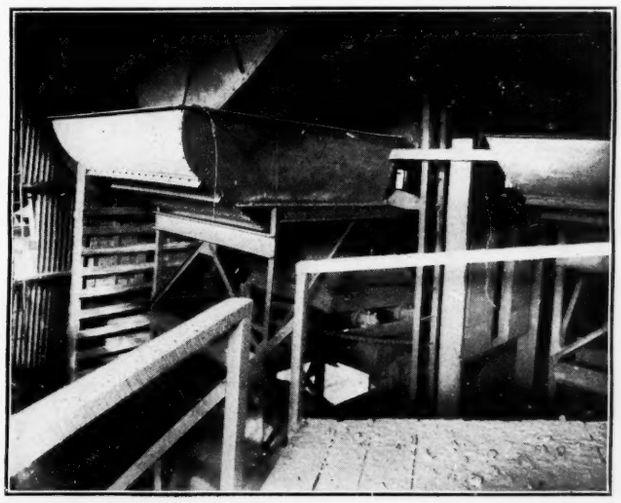


A Roberts & Schaefer Loading Boom at a Mine of the Milburn Coal Co., Keeferton, W. Va.

Planning for the future to meet new conditions and demands is more of a problem, to solve which with reasonable certainty and without unnecessary expenditure necessitates a close study of the necessary operations in screening and cleaning.

*Assistant engineer, Roberts & Schaefer Co., Chicago, Ill.

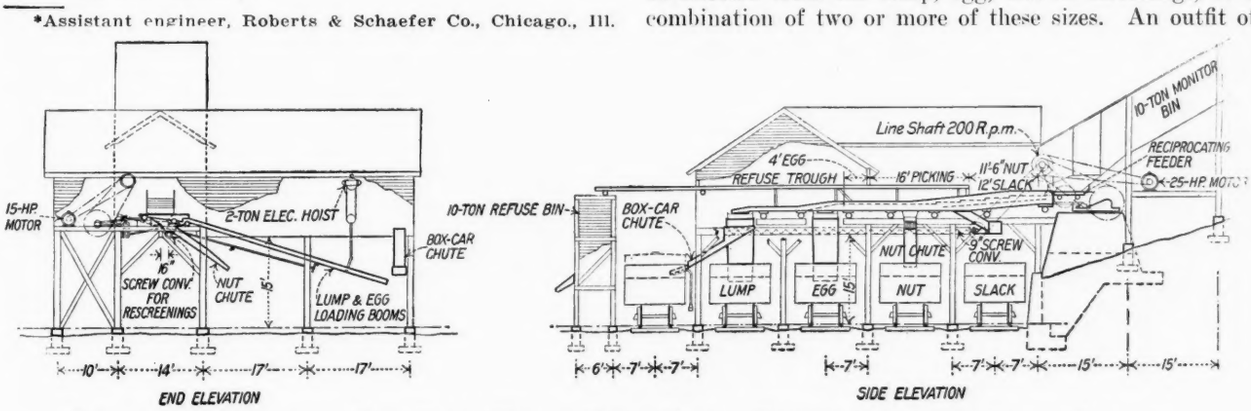
In considering coal preparation in the Central West, it should be observed that vastly different results are obtained at different mines and in different fields. One result secured is the careful sizing and handling of the coal in order to obtain a clean and uniform product. This is usually brought about by letting tonnage come secondary to quality. Most mines are so equipped that forcing the screening equipment results in the deterioration of the product.



Receiving Hopper and Reciprocating Feeder, Marianna Mine, Pittsburgh-Buffalo Co.

The opposite idea is represented by mines making few sizes, but depending on small margins and large sales for their profit. Here a large capacity and one that can easily be increased is essential. It would appear that to produce a high tonnage and give it care in both cleaning and picking would require an extensive and complicated installation. This is not always true as many mines are so equipped as to embody both features with a comparatively simple arrangement of machinery.

Coal separated into four sizes or a combination of these four will practically fulfill conditions of any use whatever; that is, coal suitable for almost any requirement can be selected from the lump, egg, nut or screenings, or a combination of two or more of these sizes. An outfit of

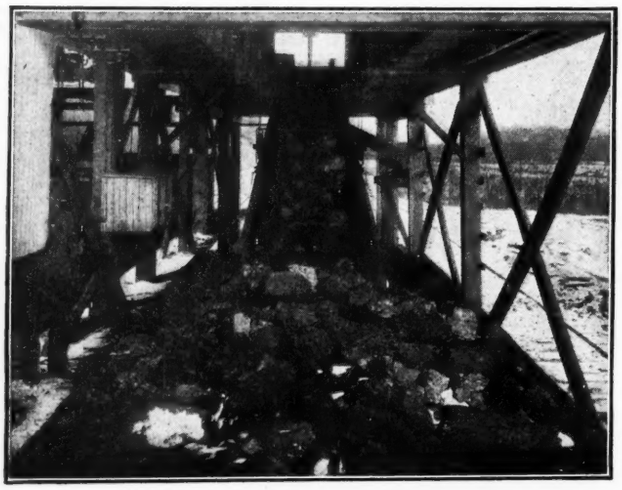


Side and End Views of Four-Track Tipple Using Marcus Picking Table Screen and Shaking Loading Booms

mechanical equipment, then, that will screen coal, weigh it, provide for cleaning, careful loading and other matters can be outlined so that by changing one or two parts and making allowance for capacity, it will provide a standard equipment that can be employed at any mine. The style of such equipment is not changed by a variation in the size of the different grades, but if these sizes could be made standard, it would work to the advantage of both producer and consumer.

The various mechanical units in which coal is treated after hoisting and before leaving the tipple have gradually developed from the simple bar screen to the modern tipple with automatic weighing devices, feeders for regulating the flow of coal, reciprocating screens and picking tables, loading booms, recleaners and various devices for handling the fuel, pickings and rock from the mine as well as equipment for the easy manipulation of railroad and mine cars.

The development of this equipment is not due to any one man or set of men, but has come from every corner of the coal-mining industry. The type of equipment under



LOOKING UP THE SHAKING LOADING BOOM

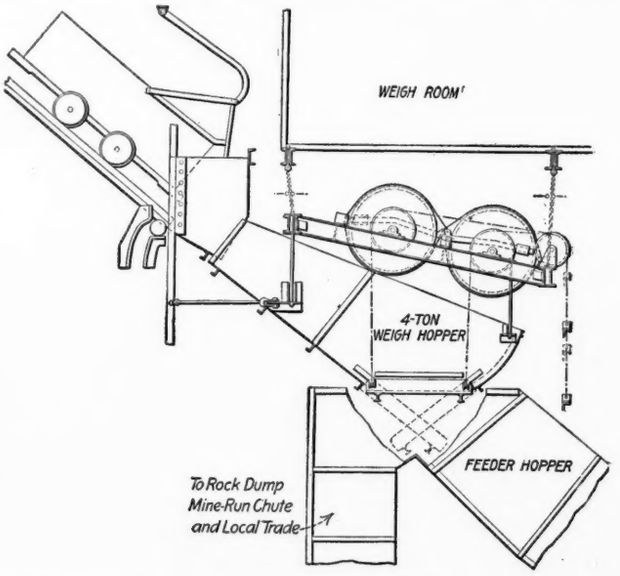
consideration does not embrace any means for mechanical cleaning or storing, as these are regarded as special cases.

After the coal is dumped and weighed, the most important consideration is to feed it regularly to the screen or picking table. The feeder is therefore an indispensable device. The reciprocating feeder is a horizontal plate placed at the bottom of the hopper and pushes the coal forward in a solid mass with each forward impulse. It has a short stroke and slow movement and handles the material without breakage.

Another popular form of feeder is the apron conveyor type which is practically a steel belt. This will feed the coal at any rate depending upon its speed. It cleans itself after each charge and also if it be made of sufficient length forms a ready means of inspecting each car of coal.

From the feeder, the coal is discharged to the screen. Until recently these screens were usually set at an inclination of about 3 in. in 12 in. The Marcus patent picking table screen, as now made by the Roberts & Schaefer Co., of Chicago, is set horizontally, and may be used as a picking table as well as a screening surface. In common with the older shaking screen, it has a screening deck composed of perforated plates, and a lower deck to receive and carry forward the coal which passes through the upper. Valves in this lower deck deliver any size of coal to its particular track or other destination. Whenever such a valve is closed, the product is carried forward, making it possible to mix any size with the other sizes below it.

After screening, it is important to load the larger sizes into railroad cars without undue breakage. Loading booms may be used for this purpose. Steel aprons and rubber conveying belts have in the past been largely used



ARRANGEMENT OF CHUTES BELOW WEIGH HOPPER

for loading. A new type of this device known as the Roberts & Schaefer shaking loader, recently introduced, consists of two shaking chutes, the forward one being raised and lowered by an electric hoist similar to the conveyor type of boom. The advantages claimed for this device are easy delivery at the extremity and the possibility of rescreening by means of small perforations after the coal leaves the shaker screen.

Coal may be picked on the upper or horizontal part of the boom or upon the horizontal screen as noted above. In preparing lump, egg and nut coal for the domestic market, it is often desirable to rescreen them as they pass over the chute just before dropping into the car. This is especially true of the softer coal. Enough breakage and chipping occur when the fuel drops from the screen to the chute leading to the cars to justify the placing of a section with round or slotted holes which will remove this dust and breakage. A small conveyor spanning the tracks under these small screen sections delivers the screenings to the car on the slack track or beyond it to a bin for boiler fuel.

It is essential that any mine of large capacity be able to dump coal directly after weighing to railroad cars. One method of accomplishing this is to place a valve in the chute or hopper below the weighing unit, which when open diverts the coal through a chute to the car. Another method is the installation of a double-dump weigh hopper which may be dumped forward to the shaker screen or backward to the mine-run chute by the operation of different levers. As the weighing point is comparatively high above the railroad track, it is easy to insert a valve or bypass to send coal to a chute for local consump-

tion, and perhaps another bypass for rock when it is desired to hoist it from the mine.

Modern market demands make it necessary to pick and screen many fuels which were formerly only imperfectly sized. The pickings are apt to contain bony coal or coal combined with small impurities as well as slate and rock. The former may often be used for boiler fuel while the latter is of course sent to a rock dump. To handle this refuse and semi-refuse, a double cross conveyor may be employed which delivers to two compartments in a small bin. The slate side of this bin delivers to a small dump car which runs to the rock dump. The other side contains the boiler coal which may be delivered to a car running to the bunkers in front of the boilers.

The foregoing illustrates how all of the special functions of the tipple may be obtained as well as the regular ones preparing all sizes of coal and any combination thereof, without interruption to hoisting or dumping.

As may be seen from the accompanying photographs all of the elements entering into the "standard" preparation plant above described are in successful everyday operation at many mines throughout the entire country.

A Successful Man

By Pennsylvania Mine Manager

For some years I have wanted to see written in the "Who's Who" column of Coal Age something of the most successful mining man I know. No one who knows him well enough to furnish the facts for such an article will ever send them to a publisher during his lifetime, I think, because he is so strongly opposed to being "written up" that there is danger of losing his friendship, and this is something so well worth having that his friends are not apt to risk estrangement for the sake of the pleasure of seeing him in print. So far as I know he has never been photographed, and I am going to try to tell about him in such a way that he will not recognize himself.

I can not resist the temptation, however, to give the state the honor of his citizenship, so will mention Pennsylvania, which I think is large enough to hide from public view several successful coal men. I am at a loss for a fictitious name. He looms up so big that no one thinks of calling him "mister." He has reached that enviable stage when he goes by his first name.

Karl Smith, or "Big Karl," was a pick miner in the days when a pick miner found something to do whether cars came or not—back in the days when coal was handled twice, if the car was not close enough, and piled back along the ribs for rods, awaiting a chance to load. So when we start Big Karl as a pick miner, don't picture a fellow who drops in from nowhere, begs a pick and shovel from the company and goes in to make coal while his empty car is waiting.

When union labor came along and held out the usual emancipation from work, Big Karl was "some agitator," but as he was "some miner" he soon found that the fraternal spirit which requires both ant and sluggard to share and share alike was not conducive to success. Not that he renounced the principles of brotherhood; but he was too big to serve blindly a system making no allowance for individual merit. His first promotion came after a mine fire. No one knew just how it came about, but he was telling how to stop it and leading the work without any further authority than just being the only one who seemed to know what to do. Probably the officials who were in charge got the direct credit for the good work; but as he was soon afterward made "pit-boss" it may be supposed that there were some people looking on who were judges of men.

Although Karl could scarcely read or write—as was not infrequently the case among the old pick miners—he handled his mine with such good judgment that he was given an adjoining mine to look after also. As the company had numerous interests and many mines, he was soon used as an inspector to hunt down and eliminate various kinds of inside inefficiency. It being necessary to make reports and do some letter writing, Big Karl "met the situation." By the way, that is his pet phrase, the watchword of his success and the only thing about this sketch which might identify him.

As he gradually built up a position all his own by meeting the various mining situations confronting the company, he studied the language of the educated men with whom he associated, and studied the spelling and punctuation of the letters he received. He has read the best journals and kept up with the best mining practice. He has not been fooled by the froth and is by no means a wide reader, but seems to have a knack of picking out what he wants.

Because of his horror of "rushing into print" he has rarely been induced to contribute to the coal journals; but of late years the public has benefited by having from him some of the best papers ever delivered before mining men. In the meantime several of our most widely known experts have built up reputations, not consciously perhaps, by publishing mining methods and experimental practice taken first hand from Old Karl's fund of practical wisdom. He is a man you cannot associate with without taking on a lot of information so vivid that you are apt to consider that you have made an original discovery.

A man of such attainments must necessarily be aware of the "virtue gone out of him" when he recognizes it in print under the name of another; but Old Karl is "some philosopher," too, and "meets the situation" by a kind of jovial cynicism all his own, and remarks on the value of education, with the usual exaggerated idea of its value so common among those who have never been under a conventional schoolmaster.

I really wonder, after all, if he has lost much. He has met the situation, anyway. I once knew a boy with one leg. He played at all the games and excelled in many. I have looked at him stripped for a swim and examined that one good leg. I am sure no one could develop two like it, and he got it by meeting situations.

I have been prompted to write of Old Karl—and he is not an old man—because I think I owe most of what mining sense I may have to him. And I pick him out as an example of success because he seems to have made the best use of his opportunities—has met the situation.

Mine Timbering in Steel

By R. B. Woodworth*

SYNOPSIS—Some facts and figures dealing with the introduction and growth in the use of steel mine timbering in the United States.

My dear ————:

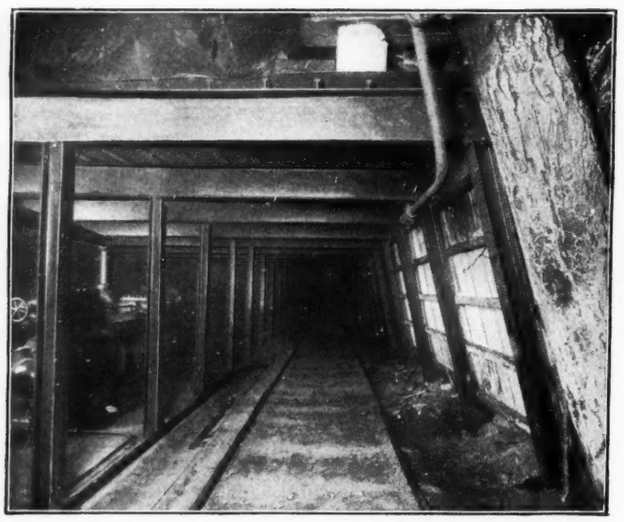
We had in stock at our ———— works several sets of standard steel mine timbers and collars. In building some overcasts, they took the liberty of using up some of the collars for these sets, and the same has caused quite a little flareup between this office and the works.

The superintendent states that he needs either 6-in. collars or 6-in. I-beams nearly every week, etc.

Yours very truly,

————,
Purchasing Agent.

This letter is typical; it represents a condition which obtains at most mines where steel mine timbers are in use, and is beyond question the result of a careful adaptation of a steel section to an unquestioned need.



Steel-Timbered Pump House and Gangway

In the year 1907, the Carnegie Steel Co. detailed the writer to make certain investigations into mine timbering conditions in the anthracite region, as a result of which it began to roll sections particularly suitable for mine-timbering purposes and to devote special attention to the use of steel in ordinary operations underground.

Previous to that date, sporadic attempts had been made by several of the mining companies to use steel, largely on account of the enormous loads which had to be carried, and without much reference to the fundamental principles of economic use which at present underlie the commercial exploitation of the use of steel.

The Susquehanna Coal Co. installed its first lot at the Stearns Shaft, Nanticoke, Penn., in 1897. The Lehigh Valley Coal Co. had in like manner installed a steel-framed pump house in the same year at Hazleton Shaft Colliery, No. 40 Slope. These two installations were followed by a few others, so that in the year 1907 there was probabily a mile of steel-timbered gangway in the anthracite coal fields.

*Engineer, Carnegie Steel Co., Pittsburgh, Penn.

In the bituminous coal fields, little had been done owing to the lighter loads to be sustained, and the general availability of good wood for mine-timbering purposes. A fire, however, had caused the Spring Valley Coal Co. to timber the shaft bottom at Shaft No. 1, Spring Valley, Ill., with 15-in. beams in 1896, some 400 ft. being in place. In the United States, however, for obvious reasons, the use of steel within the mine was not nearly so far developed as it was in Europe, and when the writer began to look into the literature on the subject, he had to draw largely on transatlantic publications, and found little dealing with installations in this country.

At the present writing, there is increasing reference to the use of steel in the mining papers of the country and in the reports of the mine inspectors, and representative installations of steel mine timbers are to be found in all coal-mining districts. It is, of course, impracticable to trace the total quantity of steel so used since many manufacturers are actively competing in this as in other fields, but in the year 1914 the Carnegie Steel Co. alone furnished to the mines sufficient plain and fabricated beams for inside mine work to timber permanently 14 miles of main headings, in addition to 700 props.

The growth of the use of steel in the mine is borne out by the sales record of that company. It is sufficient here only to set down as an indication the number of three-piece sets:

1907	190	1911	2530
1908	252	1912	4183
1909	750	1913	3681
1910	1194	1914	3845

The success in the introduction of steel within the mines is due in the first place to the rolling of sections particularly fitted for inside mine work; in the second instance, to the furnishing of such sections in simple forms suitable for immediate erection, and in the third instance, to intelligent education of mine officials and operators along the line of an ultimate economy in expenditure, based not on first cost, but on service.

While the 5x4-in. beam was introduced for mine work in England in 1885 by the Darlington Iron & Steel Co., and while a similar section was rolled in the United States previous to 1907 for use as car stanchions and similar structural purposes, the rolling of the H-beam in 1907 gave an impetus to the use of steel in the mines of the United States, for the reason that these shapes were made in convenient sizes and were exact equivalents both for strength and for weight to the ordinary forms of wooden mine timbers.

H-beams were originally designed to be used as legs in the three-piece set. In addition to that purpose, they have been used for the legs of headframes, for chords of steel trusses, for buntons in concrete-lined shafts, for hoisting guides in hoisting compartments, and for use as light columns in inside mine construction. Their use in this direction has been so appreciated by the structural-steel trade generally that they have taken a field of their own outside that for which they were originally designed. The use of the H-beam has practically displaced the earlier forms of leg sections, such as double channels used in the first installations. The range of sizes rolled is commen-

surate to all the ordinary needs of the mine, and there are a simplicity and a strength in their use not possible with any other form of rolled steel.

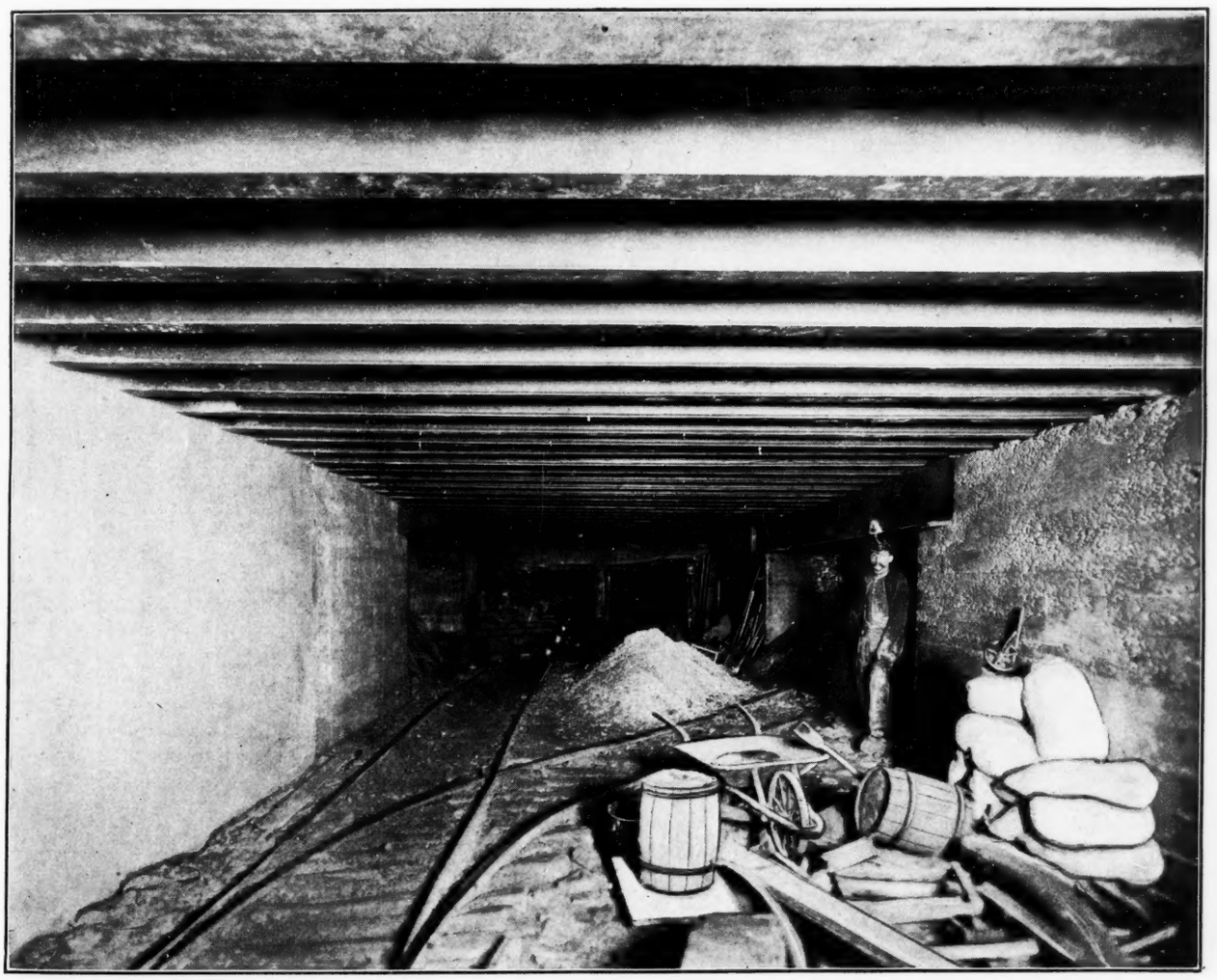
Suitable as these sections were for use as single props in the working places, it was not until 1912 that records begin to show their appearance in quantities in the mines. Since that date numbers of them came into use in the anthracite coal fields and with simple cap and base have proved a coming factor in the support of large areas under severe loading conditions.

In the anthracite regions, the three-piece mine-timber set, consisting of two H-beam legs and an I-beam collar, is the standard form of modern construction, with the H-beam prop in sporadic use. Some beams are doubtless employed supported on brick or stone side-walls, or even directly on the coal.

In the bituminous regions of Pennsylvania, while there are many installations of three-piece sets, the ordinary practice is to use plain beams on brick, stone or concrete walls. In southeastern Ohio, Kentucky and Illinois, it is usual to support plain beams directly on the coal, or on short timber sprags, although there are representative installations in these mines also of the three-piece steel timber set.

The introduction of steel in place of wood in the United States has beyond question led to a decreased cost of production just as it has done in England and on the Continent of Europe. Average experience, therefore, runs parallel to statements made in the 35th Annual Report of the Chief Inspector of Mines for the State of Ohio, who, in discussing the retimbering of large areas in southeastern districts, comments on this work:

> Even with all this retimbering which has been done in the last two or three years, the management informs me that the cost of production is a great deal less than when they attempted to operate without properly timbering the haulways and taking the risk of anyone being there when the fall occurred. This demonstrates that in keeping the mine up to a high standard of safety, efficiency is increased and cost of production decreased.



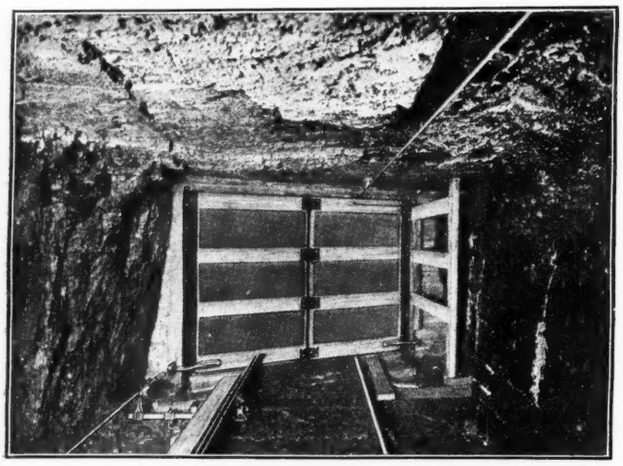
STEEL TIMBERS AT MARYLAND COAL CO.'S MINE, ST. MICHAELS, PENN.

Modern underground practice is summarily shown by the exhibit of the Carnegie Steel Co. at the Panama-Pacific International Exposition, San Francisco, Calif. The modern mine in its permanent headings at least is timbered with steel, lagged with poles, plank, concrete slabs or steel plates. Its haulage is electrical, power being transmitted on overhead copper wires, suspended from steel beams by simple hangers. The product is hauled in steel cars, supported on steel axles and solid rolled steel wheels. These wheels traverse steel rails, carried on steel cross ties. The exhibit represents many an actual installation, successful by reason of the intelligent coöperation of the manufacturer with the operator desiring the very lowest maintenance cost.

Mine Doors for Coal Mines

An automatic mine door is now in operation in the No. 2 mine of the Madison Coal Corporation at Glen Carbon, Ill. It was installed on Aug. 22, 1912, by C. L. Bowman, representing the American Mine Door Co., of Canton, Ohio. Upon the successful installation and operation of this and several similar machines the Madison Coal Corporation ordered 74 additional doors of the same pattern.

Briefly, the construction and method of operation of this device are as follows: The door extends diagonally across the track and consists of two sections swinging in unison in opposite directions by means of a connecting bar extending beneath the tracks. Steel channels extend either way about 32 ft. from the door, one leg of the channel being in alignment with the inner edge of the track rail. Each of these channels is in two sections hinged at



MINE DOOR IN MINE NO. 2, MADISON COAL CORPORATION, GLEN CARBON, ILL.

a point 14 ft. from the farther end so as to permit of a vertical movement of the channel through a distance of about 5 in.

At three points on the underside of each channel toggle joints connect with levers which are secured to a rocker shaft. Other levers attached to the outer end of these rocker shafts are connected directly to each other and to each door by a system of links and rods. The arrangement is such that the channels are in an elevated position when the door is closed.

When a car or motor passes over the track it engages one of these channels, forcing it down, which movement communicated to the toggle joints turns the rocker shaft, which in turn actuates the rods and opens one wing of the door directly and the other indirectly through the connecting bar. To the middle rocker shaft on either side of the door is fixed a lever upon which an adjusting weight is placed. This is so arranged as to give sufficient power to close the door after the wheels have passed off the channel.

The construction of doors and door frames is such as to afford great rigidity with a minimum of weight. The panels themselves are covered with sheet metal and the joints at the top and sides are made airtight by specially treated cotton duck.

There are several reasons for placing the doors slantwise across the track. When so placed each half of the door moves through an arc of only 60°, whereas if placed squarely across the track it must of necessity swing through 90°. It is obvious that this position renders the operation of the door more rapid and positive. Since the two wings forming the door open in opposite directions, the air pressure is equalized, and this pressure tends to close one wing with as much force as it opens the other. The doors are thus capable of operating successfully under heavy pressure, while the air current may be reversed in direction without blowing the door open.

Such a door does not open until the trip gets to it, and closes as soon as the trip gets past. It is continually on the job—days, nights, Sundays and holidays, when trappers may be absent. It saves a considerable quantity of air, since it usually remains open for only a fraction of a minute. It reduces the liability to explosion because it remains closed when not in use. By its use the human element is eliminated, and with it the great danger to life and limb of trappers. On account of its economy it allows the placing of certain sections of large mines on a continuous air current, thus increasing the volume of air to each place and eliminating the necessity for expensive overcasts.

A Question

BY A. M. INER

I have been told the life story of a miner who is now well past the meridian of life; who would undoubtedly be regarded by expert mining men as being well versed in the principles and practice of his profession; sober, persevering and industrious, but who has never attained to any position of prominence in the industrial or social world.

He entered the coal mines before he was 12 years old. As time passed, he observed that those who occupied positions of trust and influence in the industry possessed or were supposed to possess educational advantages superior to the common coal miner. Naturally inferring that education was the keynote to advancement, his ambition was aroused to secure the possession of these powers. The time devoted to this was pilfered from his hours of recreation and recuperation. He learned the full truth and importance of the poet's expression as applicable to his own case:

> The heights by others reached and kept
> Were not attained by sudden flight;
> But they, while their companions slept,
> Were toiling upward in the night.

During the process of acquisition, he learned of the existence of a great moral truth; namely, that all men are spiritually equal, and by virtue of this equality they have rights that must be respected, and that he who infringes upon these rights, through the accident of position or power, is guilty of a crime against his Creator. Basing his rule of life upon this principle, he exerted his utmost endeavors to put it into practical application.

THREE CHARACTERISTIC ELEMENTS

In studying the biographies of great men he perceived that three characteristic elements were emphasized as forming the prime factors in the realization of an ideal; namely, honesty, industry and perseverance. Honesty he construed to mean the invariable practice of truth and justice as based upon the great moral law; industry, as be-

ing the honest employment of all the energies of body and mind in the performance of his duties; perseverance, as being the practice of honesty and industry in face of all discouraging opposition.

Actuated by these motives, he studied, practiced and observed, and succeeded, while yet young, in securing the necessary legal recognition of ability to fill any position in or about a coal mine. Not satisfied with this attainment, he continued his studies and practical work with the object of acquiring, as far as possible, a complete mastery of the subject, believing that he could thus become of more value to his employers and a source of greater good to his fellowmen. He secured an inferior position and discharged his duties faithfully and well, being able to bring to his assistance new and practical ideas of economy and efficiency. After several years, he was promoted to a slightly higher position, the duties of which he discharged in an equally commendable manner.

This, however, was the summit of his advancement. Since then he has been filling minor positions, almost invariably under men who are his inferiors so far as ability is concerned. In all this time he has faithfully adhered to his ideals of what is right. He treated the men over whom he had charge with invariable courtesy and kindness, enforcing obedience with firmness, and discipline without harshness. His men trusted him for his integrity and respected him for his justness. His intercourse with his superiors in position was marked with courtesy, respect and a degree of deference commensurate with dignity, but never with cringing or servility. He has availed himself of every opportunity and means for an honorable advancement.

The foregoing is no melodramatic character created from imaginary moral virtues. It is a human recital of an actual case. The story is not brought forward to point a moral, but rather to question the truth of an accepted fact. Is this man a success or failure? If success be the inevitable result of the practice of the principles stated, then he is most assuredly a success, but he is not so accepted. He possesses neither wealth, influence nor high position—three essentials dominantly characteristic of success as the term is generally accepted.

If there be some other element indispensable to a successful life, it has not been emphasized in the portrayal. Why? If it be honorable it should be known, or is it possible that what we so generally accept as success is simply the attainment of an end irrespective of the means or the demands of the great moral law?

The above cartoon illustrates a thought that bears more directly and more forcibly on the question of individual success than any other idea that might be advanced. Even unusual ability is impotent if it is not backed by the vigor and energy of healthy manhood. Mr. McCay, in his drawing, shows plainly how the great obstacles in the way of the man climbing toward success are pushed aside by health. When we are overworked or are distressed by sickness or debt, it follows that the degree of personal efficiency we attain in our work must be very low. Man might as well try to reach the moon as to hope for success while sickness and disease are sapping his vitality and strength. If we would be successful, we must first be healthy.

Coal Preparation at New Mine of Old Ben Mining Corporation

By L. S. Richards

SYNOPSIS—The Old Ben Mining Corporation, of West Frankfort, Ill., has installed a large spiral coal-cleaning plant at its new No. 9 mine, as its use of the spiral at the No. 8 mine proved the value of that device for removing bone and slate. A picking table and screens for the cleaned coal make the delivery of a high-grade product certain.

One of the most successful plants in operation today for preparing bituminous coal for market is at No. 9 mine of the old Ben Mining Corporation at West Frankfort, Ill. It is of especial interest, first, because the method of cleaning the coal is new to the bituminous field; second, because of the flexibility of the arrangement of the tipple and the thoroughness with which each step in the operation has been worked out and, third, because of the attention which has been given in design to selecting machinery of the greatest durability.

Development of Needs Shown in Earlier Plant

D. W. Buchanan, of the Old Ben company, has given the preparation of coal much study. This plant is the outcome of this careful consideration and was designed along the general lines of the equipment at their No. 8 mine after that plant had been in operation about three years and had proven that the method installed there would clean the coal in that vicinity both completely and economically. A great saving, both in loss of time and expense of upkeep, can be effected where both design and material are well selected. This is proved by both of these plants, for it is unusual to hear of either mine being idle because of a breakdown.

The tipple and rescreening plant are built entirely of steel and are of substantial design. The greatest care has been taken to provide ample clearances and ready access to all machinery. The floors are of concrete, and plenty of windows for light and air have been provided, thereby making the task of the workman easier to perform and his work consequently more efficient. By noting the windows in the lantern of the sizing plant, as seen in the illustration, an idea of the excellent lighting provided will be gained.

The coal is hoisted from the shaft in 4-ton mine cars and dumped directly into a weigh-box. The elimination of the usual dump chute lessens the drop of the coal into the weigh-box, thus saving in the breakage of coal. The weigh-box in turn discharges directly onto a pair of 10-ft. shaking screens. These are of ample width for the screening so that any necessity for a feed hopper at this point is removed. This also makes a big saving in the breakage of coal.

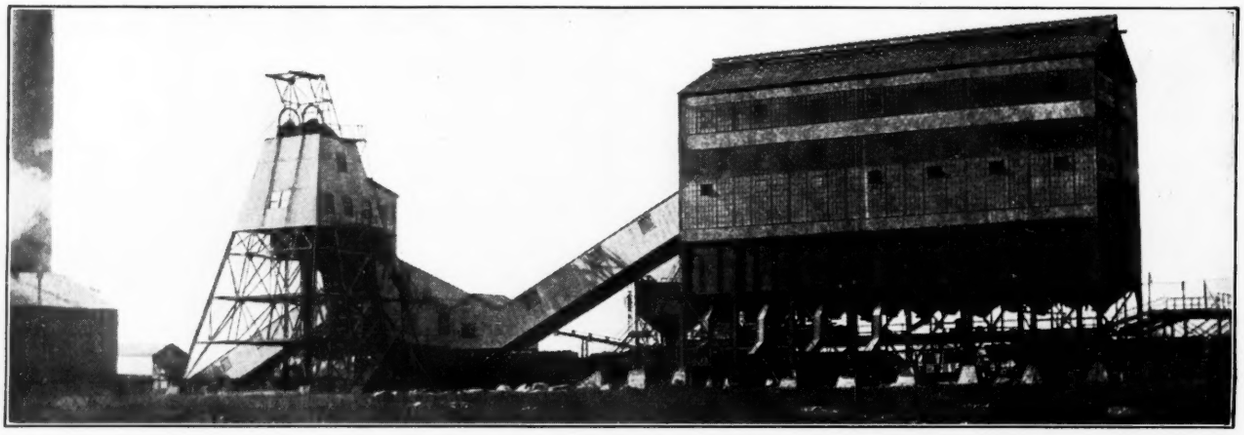
The shaking screens are supported by heavy 14-in. chilled-tread rollers, and the roller races on the screens are heavy castings provided with removable wearing strips of machine steel.

The Manager Can Deliver Coal to Satisfy Almost Any Size Specifications

On the screens the coal is separated into 3-in. slack, 3-in. to 6-in. egg and 6-in. lump, and by means of a flop-gate at the upper end of the upper screen the run-of-mine coal may be loaded directly into railroad cars on the slack track if desired. The 3-in. slack may be loaded directly into railroad cars or may be passed to a conveyor for delivery to the sizing plant. The egg coal may likewise be loaded directly into railroad cars or may be passed to the sizing-plant conveyor with the 3-in. slack, or it may be reduced in a 36x48-in. two-roll spring-relief coal crusher located under the screens to 3-in. slack and then passed to the sizing-plant conveyor.

The lump coal may be passed through a flop-gate in the lower shaking screen to the crusher and thence to the sizing-plant conveyor, it being reduced to 3 in. or 6 in., or it may be discharged over the end of the lower shaking screen to a flat-top apron-conveyor picking table and loading boom.

The loading boom is operated by a 4½-ton self-con-



General View of Tipple and Sizing Plant at No. 9 Colliery of the Old Ben Mining Corporation at West Frankfort, Ill.

tained direct-current electric hoist, which permits of the boom being handled quickly and easily by the operative, thus lessening the chance of his neglecting to keep the end of the boom in position to give the minimum fall of coal into the car.

Picking Table and Rock and Bone-Coal Handling Devices

The horizontal length for picking is about 20 ft. and at the end of this level portion a hinged plow has been provided so that the coal may be discharged from the conveyor at this point into a telescoping box-car chute serving cars on a track outside of the lump track.

The rock from the picking table is passed by the pickers into a 24-in. apron conveyor located directly alongside the picking table. This conveyor elevates the rock to a rock bin over the lump track. This bin has a capacity of about one car. The bone coal picked from the lump is passed by the pickers to a 24-in. belt conveyor and delivered to the crusher and thence to the sizing-plant conveyor.

"Foreign" Coal Will Also Be Cleaned

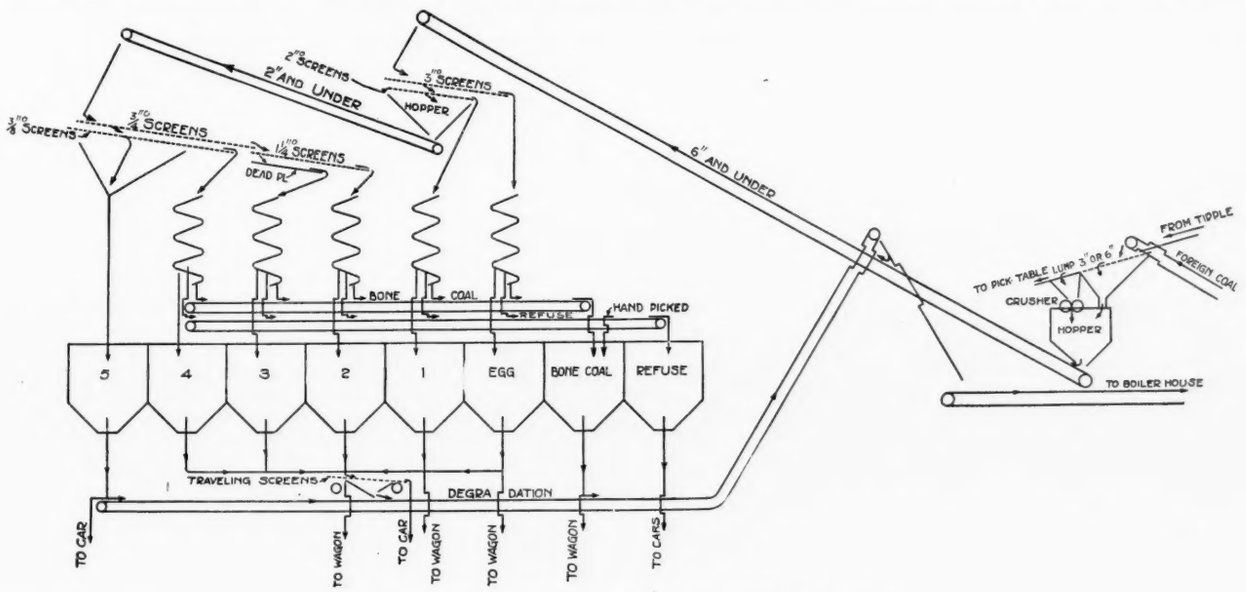
Provision has been made for bringing "foreign" coal to the plant and sending it to the sizing plant in the following manner: Under the egg track on the side of the tipple opposite the sizing plant is a track hopper for unloading railroad cars. From this hopper the coal is elevated by a 60-in. inclined apron conveyor and discharged onto the shaking screens, into the crusher or direct to the sizing-plant conveyor.

The conveyor to the sizing plant is a 60-in. inclined apron conveyor of the same type as that for the foreign coal. These conveyors are made of 60-in. steel overlapping pans with malleable ends mounted on a double strand of 18-in. pitch-bushed bar-link rolling chain with 8-in. inclosed oiling rollers. The sizing-plant conveyor elevates the coal to the top floor of the sizing plant, where it is delivered by means of a bifurcated chute to two sets of shaking screens, each set being made up of two screens, one 6 ft. wide with 3-in. perforations and the other 7 ft. with 2-in. perforations. These screens make a 3- to 6-in. egg, a 2- to 3-in. nut and a 2-in. slack.

The 2-in. slack is delivered to a 48-in. apron conveyor of the same type as the main conveyor and elevated and delivered by means of a four-way chute into four sets of two shaking screens each. One screen of each set is 4 ft. 6 in. wide with two decks, the perforations in the upper deck being ¾ in. in diameter and in the lower ⅜ in. The other screen is 3 ft. 6 in. wide and has a single deck with 1¼-in. perforations. These screens separate the 2-in. slack into 1¼- to 2-in., ¾- to 1¼-in., ⅜- to ¾-in. and ⅜-in. slack.

Screens of a New Type

The type of screen used is patented by Mr. Buchanan and is made with 3x6-in. pine side timbers and supported by 1-in. ash boards. These boards are rigidly attached to the screens and to the building structure, the movement of the screen being taken by the spring of the boards. The connecting-rods driving the screens are also of ash of 3x6-in. section. These are rigidly bolted to the screen side timbers and to the eccentric straps and are necked to a 3x3-in. section in the middle portion so as to allow them to spring sufficiently to take care of the vertical movement of the eccentrics. This type of screen has been used in a number of installations during the past few years and has proven satisfactory for the sizing of small coal.



Flow Sheet of Sizing Plant at Old Ben No. 9

The Spiral Separators

Each size of coal except the slack is delivered by the screens to a set of spiral separators, there being six spirals for each size of coal on each side of the building, making twelve in all for each size. The spirals take out the bone coal and refuse, and each size of cleaned coal is delivered by means of conveyor spirals to two bins, one on each side of the building. The bone coal and refuse on each side pass to separate 18-in. belt conveyors, and by means of two 18-in. belt conveyors running across the building the bone coal is delivered to a bin on one side of the building and the refuse to a bin on the other side. The refuse

is hand-picked on the cross-belt conveyor before it is discharged into the bin. The pickings are thrown over to the bone-coal belt.

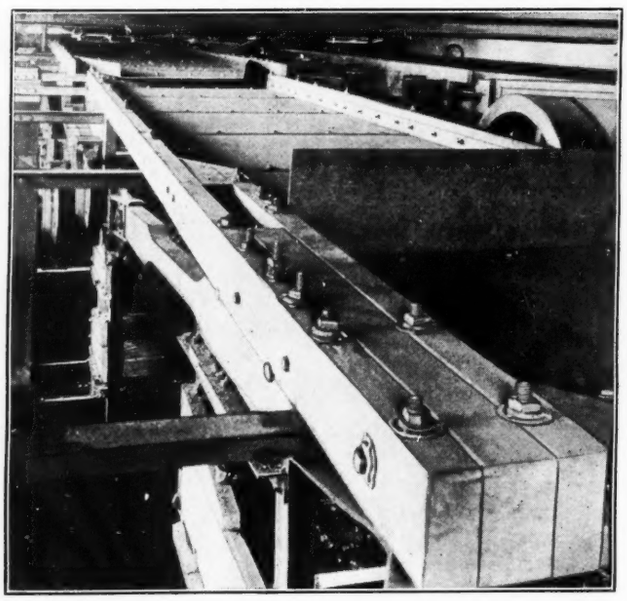
The spiral separators were furnished by the Anthracite Separator Co., of Hazleton, Penn., and they have proven very successful on this coal. The total storage for each size of coal in the rescreening plant is 250 tons and 125 tons each for the bone coal and refuse.

After Cleaning and Conveying the Fuel, Fine Coal Is again Screened Out

The cleaned coal is drawn from the bins by means of special rack-and-pinion gates and delivered to railroad cars, the five larger sizes passing over a traveling lip shaking screen, which insures the coal being loaded without undersize or dust. One of these screens is located over each track. These screens are also patented by Mr. Buchanan and are of the same type as those in the rescreening plant. Each screen is mounted on a structural-steel carriage with heavy double-flanged rollers running on a pair of rails carried from the bin columns on each side of the track. Two independent motors are mounted on the carriage, one for driving the screen and the other for the travel mechanism.

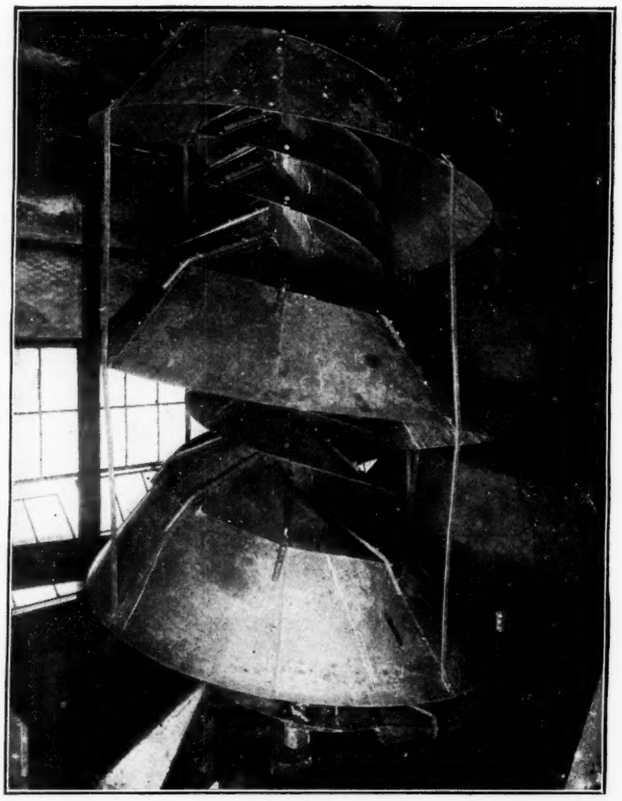
Boilers Are Fed by the Bone Coal, the Dust from the Cleaned Coal and Some Slack

The bins on one side for the three larger sizes of coal as well as the bone-coal bin are provided with chutes with undercut gates for supplying the wagon trade. The degradation from the traveling lip screens is collected by a 20-in. apron conveyor midway between the tracks and discharged onto a 20-in. belt conveyor, which carries it either to a conveyor for delivery to the boiler house or to the main sizing-plant conveyor and back to the sizing plant. Chutes are also arranged for delivering slack and bone coal to the degradation conveyor, and thence to the conveyor leading to the boiler house.



Buchanan's Patented Screens

The boiler-house conveying system consists of a 20-in. belt conveyor running alongside the slack track and inclined for about two-thirds of its length. This conveyor discharges onto a 12x5-in. horizontal double-strand flight conveyor, the whole system having a capacity of 40 tons per hour. The flight conveyor distributes the coal over a steel bunker in front of the boilers, from which it is drawn by spouts.



Spiral Separators

The various units throughout the plant are driven by individual motors, avoiding the necessity of long drives and a multiplicity of line shafting. The plant is designed for a capacity of 5000 tons a day and it is probable that this capacity will be reached in the near future.

The complete machinery equipment was designed, manufactured and erected by the Link-Belt Co., of Chicago, and the building structure was designed and built by the Wisconsin Bridge & Iron Co., of North Milwaukee, Wis.

Mr. Buchanan has every reason for feeling proud of this plant as it is without doubt one of the most uptodate in the bituminous coal fields today.

A Failure

By Pennsylvania Engineer

Yesterday a man moved from our camp who is a failure. Since the first of July he has been out of work and has now secured a job at $2 a day.

Two years ago he was recognized as the best master mechanic in our region and drew a salary accordingly. Today he is down and out, and yet he is in the prime of life. The reason is that he became a "knocker." Success turned his head, and he wanted everything his own way. The general manager, superintendent, mine foreman, all were classed as "know-nothings" and fools if they did not agree with him. Not content with his disparaging remarks concerning them at our own plant, he carried his

unjust comments to the surrounding plants, and his reputation as a master mechanic gradually became nil. Regardless of all our efforts to aid him and break him of this habit, he became worse and worse, and it was at last necessary to let him go.

Two years ago nearly every plant in the region would have been glad to secure his services; today no one wants him at any price. He is the most capable man I ever saw around machinery, and yet today he is down and out—a complete failure.

Success with Steel Mine Ties

By J. C. Evans*

Many steel mine ties have been patented. The majority of these have never been placed on the market, as the patentees were unable to interest practical men in their manufacture, since the ties were either too costly or were impractical from the mining man's standpoint. Others have reached the market at considerable expense, only to meet with failure. After considerable experimenting, J. J. Ross, a practical mining engineer and at the time general superintendent of the Hutchinson Coal Co. at Fairmont, W. Va., on Apr. 6, 1909, received a patent covering the channel tie which he had developed and tried out. This device is now known as the Fairmont tie.

Mr. Ross then organized the Standard Tie & Manufacturing Co., of which he is the president. After making distribution of several thousand ties during the year 1909, this company, after considerable investigation, made arrangements with the Fairmont Mining Machinery Co. whereby the latter was given the exclusive right to manufacture and sell this tie.

Top-Cutting Machine Operating on Track Laid with Fairmont Ties

During the year 1910 about 50,000 of these ties were placed in the mines, mostly in small trial lots ranging from 100 to 1000 ties, with the understanding that they could be returned at no expense to the mine owner if they were not a success. The same policy has been carried out each succeeding year, with the result that 99 per cent. of the trial consignments have been retained, and an increase in the size of individual orders as well as the total number of ties sold has been experienced.

The accompanying illustration shows a top-cutting mining machine in actual operation in Mine No. 303 of the Elkhorn Mining Corp., and operating upon tracks laid with Fairmont mine ties. This machine has a sweep of 21 ft. and weighs 7 tons, which will give some idea of the pressure placed upon these ties.

This steel mine tie has been successful at many other operations. There are over 200 mines that have in use this tie in quantities ranging from 500 to 50,000, while 300 other mines have these ties in lots of less than 500, in most of which cases they are being tried out. Four large coal companies have 180,000 Fairmont ties in use, or an average of 45,000 ties each, none falling below 41,000. Ten other firms have 115,000, or an average of 11,500 ties each.

Considering the short period since the Fairmont tie was placed on the market and the unsatisfactory conditions in the coal business during the last two or three years, this record spells success.

*Fairmont Mining Machinery Co., Fairmont, W. Va.

Hard Work, the Great Essential to Success

By E. H. Weitzel*

A great many qualities contribute to any man's success. Some have qualities which others lack. Some qualities which contribute to one man's success might not be helpful to another. The one great essential to success in any line of endeavor is hard work, and the measure of success of most people is in direct ratio to the application they are capable of giving to their business.

Natural ability, education, personality and opportunity are the chief contributing causes in the order named, but none of these, no matter how liberally they may be bestowed, will be productive of success without the added essential of consistent, conscientious effort.

In reviewing the history of the men who have achieved the greatest success in the present generation in our own country, we cannot fail to be impressed with the thought that the experience of almost extreme poverty in their early youth was a factor which contributed to their later success by teaching them early the lessons of economy and thrift and by requiring a habit of work which in most cases amounted to drudgery. Lack of early education does not seem to have hindered these men, and their success should lend encouragement to the youth of the land today, when there is so much being said on the subject of early education and lack of opportunity for those born in poverty and with so few of the advantages that are supposed to be necessary for their future well-being.

*Manager, coal mines, Colorado Fuel & Iron Co., Pueblo, Colo.

On Selling Coal

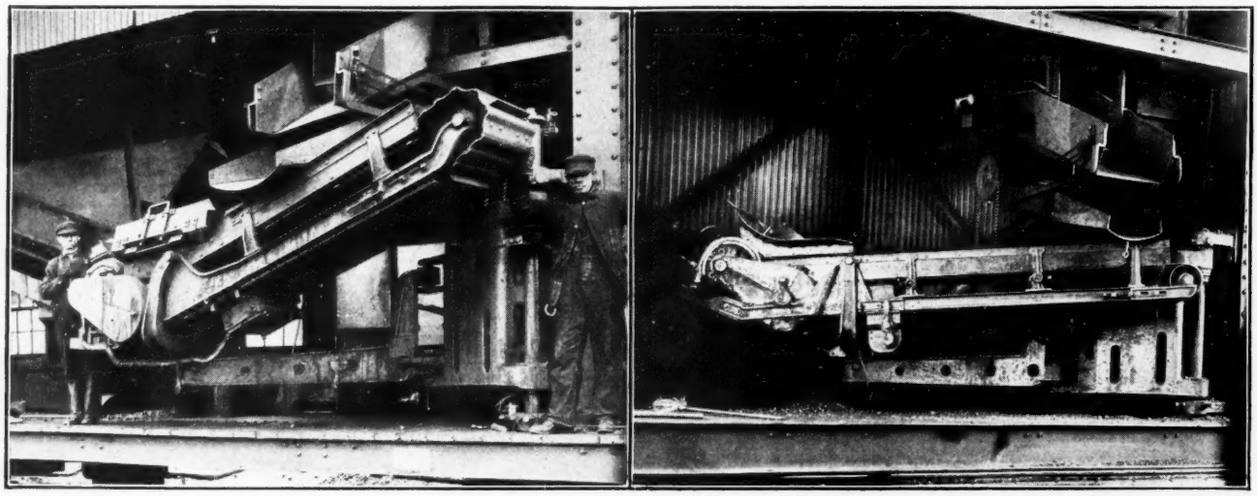
Count that day lost
Whose low descending sun
Sees coal sold at a loss
And business done for fun.

—The Dealers Fuel Co., St. Louis, Mo.

A Successful Box-Car Loader

Successful devices for loading coal into box-cars without breakage have been slow in development. Coal was first loaded into this type of car by hand with shovels, and the first machine devised for this purpose attempted to duplicate hand work. Improvements were introduced from time to time, the constant trend of which was in the line of a conveyor which would deposit the coal gently instead of throwing it into place.

The general type of loader of which this article treats is a conveyor. The idea was first applied in the loading of coke, the product being carried on a rubber belt. This conveyor was supported on hinged arms, which allowed it to be pushed well into the box-car. Operated electrically, it took 66 per cent. of the coke or coal from the chute, carried it on a belt to its resting place and allowed it only a short drop. The remainder of the material was tossed a short distance so as to roll off the pile into the end of the car. This was the basic idea of the original Manierre box-car loader, and has been retained in succeeding machines.



STEEL-APRON AND BELT MANIERRE BOX-CAR LOADERS ON DOCK OF THE BERWIND FUEL CO., SUPERIOR, WIS.

In July, 1914, the Berwind Fuel Co., at Superior, Wis., was having trouble loading coal into box-cars. It was believed that the most modern equipment obtainable was being employed. Three different makes of loaders of the throwing type for lump coal and a Manierre belt loader for sized fuel were being employed. Each was the latest product of its respective company. But the lump coal gave trouble, the big pieces falling apart when thrown against the ends of the box-car. Complaints had been numerous the previous winter and were already beginning to trickle in on the new season.

Then came George Manierre with his new loader, built to convey lump coal rather than throw it. This particular machine had a steel apron and was designed especially for large-sized fuel. The Berwind people were skeptical. They considered that a new type of loader was merely another means of breaking coal. But the Manierre machine which they then had in use worked fairly satisfactorily on coke and sized fuel, but for lump coal was not altogether desirable.

Mr. Manierre had, however, installed several steel-apron loaders and knew what they would do. The dock manager was interested, but felt that the new type of conveyor was still in the experimental stage, and he did not care, as he stated, to engage in costly experiments. It was suggested that steel-apron loaders already in use be inspected; and since the belt loader was admirably performing the work for which it was designed, the steel-apron machine seemed to deserve the courtesy of this inspection.

Mr. Manierre then proposed to write a guarantee on the performance of his machine, as he had confidence in it and the work which it would perform. The inspection of steel loaders in operation followed immediately, and as a result a steel-apron box-car loader designed to handle lump coal was installed. At the present time this loader is satisfactorily performing the work which up to its installation had been accomplished only imperfectly. Lump coal is now delivered to the cars as lump, not slack.

It is better to be a success as a coal miner than a failure as a schoolmaster. In the one case you are adding to the world's goods; in the other you are likely to be misguiding the rising generation.

The Man Who Wins

BY HARRY N. TAYLOR*

The old-time mine manager or pitboss, with his hit-and-miss methods, is a thing of the past. With the swing of the pendulum, the mining engineer depending entirely on theory and technical practice has had his inning and has passed into the discard. The man who has attained his knowledge by long training has taken the places once filled by the promoted coal-digger and the ultra-technical office engineer.

The really successful mine manager of today is a combination of the two. He must be a hard-working, practical underground man, with enough education along technical lines so that he can apply both theory and practical knowledge to his daily work. Such a man gets results. When a man can be found who can add to these two most necessary qualifications horse sense and an ability to deal with his men fairly but firmly, he is sure to make his mark and attain full and lasting success.

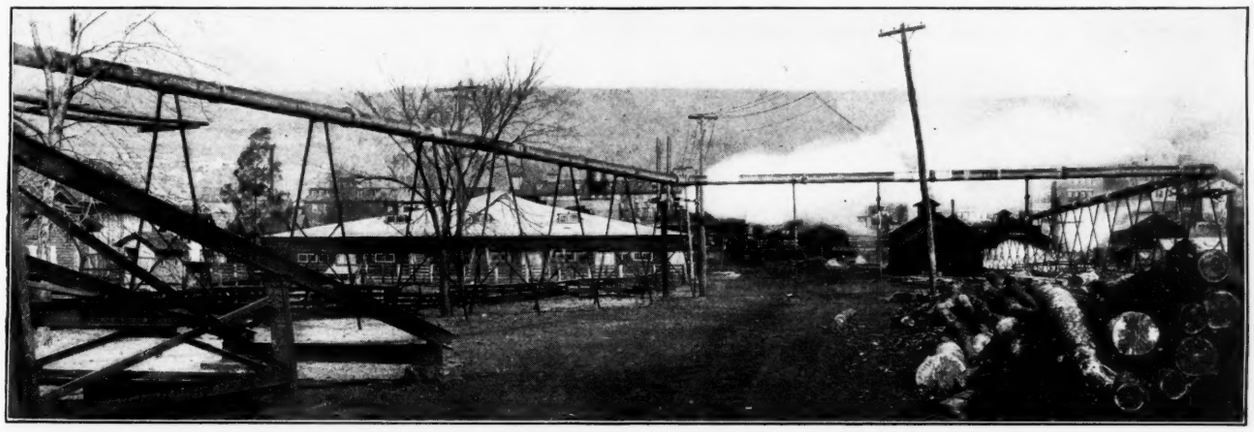
*Vice-president, Central Coal & Coke Co., Kansas City, Mo.

Such men are sought far and wide in the coal-mining industry and will always be first choice when the management of any large operation is in want of a mine manager. Being successful, their positions are always secure. Success attained by methods approved by all men is success worth while and will bring a far greater reward than success (so called) when the method of attainment is questionable. Hard work, good education, common sense, loyalty and firmness all point the way to the goal.

Economical Pipe Covering

The success here recorded is not by any means new. That, perhaps, is in its favor rather than the reverse, for in the 13 years intervening there has been time to show whether the success was temporary or permanent. In that length of time the ownership of the colliery has changed, but the pipe and its covering still continue their work. The covering was placed by the Parrish Coal Co., of Plymouth, Penn., but the mine is now owned by the Lehigh & Wilkes-Barre Coal Co.

The steam line to be covered was 14 in. in diameter and 1600 ft. long. The immediate coat placed over the pipe was J.-M. Asbestos-Sponge felted sectional pipe covering wrapped with wire, then a layer of rosin sized paper wrapped with twine, and another layer of hair felt 1-in. thick and also wrapped with twine. Over this was a layer of rosin sized paper held in place by twine and over all a jacket of asbestos roofing wrapped with galvanized wire.



Showing Covered Pipes at a Colliery of the Lehigh & Wilkes-Barre Coal Co., Plymouth, Penn.

According to tests made in the anthracite coal fields, it has been determined that an uncovered 14-in. steam line carrying live steam at 100-lb. pressure would waste 0.54 lb. of boiler fuel for every linear foot per hour. This waste of fuel would in a year amount to 3784 tons, and in the 13 yr. would total to no less than 49,192 tons. It is estimated that 91 per cent. of the loss is avoided by the use of this covering. Thus 344 tons of coal were saved every year, or 44,765 tons in the whole life of the coating to the present date.

Nearly a Cent and a Half per Ton Mined Saved by Pipe Covering

Thus calculated, the losses of inefficiently or uncovered steam lines are made quite clear, but yet there are coal-mine managers who apparently cannot see them. The plant of the Elkins Coal & Coke Co., at Bretz, W. Va., near Morgantown, used in December and January 4.4c. worth of fuel per ton of coal mined. On Feb. 1 the pipes were covered with Asbestos-Sponge felted pipe covering, and the manager, J. B. Hanford, states that the cost in the two months following was 3.1c. per ton of coal produced. The gain in that length of time was $307.20. As the total cost of the covering was about $800, it is clear that it will pay for itself in the first six months.

At the plant of the Phoenix Electric Co., in Butte, Mont., this same covering has been in use on 3500 ft. of pipe for five years in the steam tunnels. According to James E. Davidson, the superintendent, the condensation meters on these mains show approximately 11 per cent. less condensation per square foot of radiation surface than where the coating is 85 per cent. magnesia. The coverings mentioned are manufactured by the H. W. Johns-Manville Co., of New York City.

Saving in Kerf and in Blacksmithing Labor

In sections of the country where timber stumpage was cheap the circular saw had its great advantage in lumbering, but the band-saw is fast driving it out of use because the kerf of such a saw is far thinner and the saving of timber in cutting a stick into planks by such an economical machine is considerable. Sawdust is an unsalable product, and in fact in many cases it actually takes power and costs money to burn it. As soon as the surrounding country becomes populated it is no longer permissible to wash the sawdust into the streams. As a result the wide kerf-making circular saw has been largely driven from the mill.

Similarly the wide-awake colliery manager is striving to reduce the kerf in coal mining, not perhaps so much to save valuable coal as to avoid paying for mining, hauling and handling a fuel for which the market is not willing to pay a fair price. The ideal of the mine manager is to get all lump coal, just as the ideal of the saw-mill owner is to convert his standing timber into planks, boards or veneers without any unnecessary loss.

It was to gain this end that the Wasson Coal Co., at Wasson, Salem County, Ill., installed chains which made a kerf of 3½ in. instead of 4½ in., thus reducing by 22 per cent. the "bug-dust" made by the machine cutting and lowering the current used per machine from 60 to 39 amperes, or about 40 per cent. Concurrently the strain

on the machine was reduced, more coal was cut and less bits used.

The cutterhead used in connection with this chain is one having all wearing parts renewable, and grease lubrication for idle sprockets is supplied by a compression cup built into the stud.

The problem solved at Kincaid, Ill., by the Peabody Coal Co. was the rapid sharpening of bits for 20 electric chain mining machines. To keep such a large number of machines in sharp bits required two power hammers and four men, and even then they had difficulty in keeping up with the work. So the Peabody Coal Co. installed a Morris automatic bit machine for test. The other mines of the company have now been equipped with these machines. The result has been uniformity in the bits, greater capacity, reduced necessity for repair of mining machines, less consumption of power, fewer bits to sharpen and reduction in the cost of sharpening.

The reduction in slack, increased speed of cutting and decreased use of power foreshadow changes in our present methods of working if slack coal continues to be a drug on the market. The chains and bit machine described were supplied by the Lott Mine Equipment Co., of 538 South Clark St., Chicago, Ill.

If a man but discovers an improved way of handling a pick he has achieved success of importance to the world.

Successfully Draining a Flooded Mine

By J. J. O'Connell*

SYNOPSIS—Through the bursting of a canal the lower levels of a mine were flooded. New steam pumps were procured and after three months of continuous operation the submerged workings were recovered.

In many coal regions the pumping problem is an ever present one, the successful solution of which requires much skill and the selection of capable equipment.

A pump to successfully cope with the severe conditions encountered in coal mining must be simple, compact, rugged, and sufficiently heavy to stand considerable rough handling and also meet emergencies demanding excess capacity. Water enters the mine from all sides. So long as its flow is uniform or nearly so, the pump can usually eject it and keep the mine in good working condition, but there is always the danger of drowning out the workings by a sudden flood from some unforeseen source.

Just such an accident as this occurred in the coal mine of the G. B. Markle Co. at Jeddo, Penn. This firm operates several mines covering a considerable area in the neighborhood of Hazleton. A number of widely separated shafts are connected on the surface by steam railroads.

About 3 o'clock one December morning several years ago, the night pump man at Mine No. 5 noticed an unusually large volume of water rushing into the tunnel a short distance from where he stood. By hurrying out of the mine he narrowly escaped with his life.

An investigation showed that this sudden influx of water was caused by a break in a canal on the side of a hill above the mine. The escaping water had forced its way through a manway down to the lowest level of the mine about 500 ft. below the surface. As quickly as possible the steam pumps on the upper level were put to work and efforts made to check the flood. It had gained considerable headway, however, and in a comparatively short time the entire lower level with all the machinery and equipment was completely submerged, and it was promptly decided that in view of the seriousness of the situation more pumps of larger capacity should be installed at once.

John Markle hurried to New York, and had a conference with the engineering staff of the A. S. Cameron Steam Pump Works, he knowing from past experience that the Cameron pump in emergencies was capable of working far in excess of its rated capacity for a considerable length of time, even when submerged with water. He accordingly ordered two of the largest steam pumps in stock, a 20x12x20-in. piston pump, with a normal capacity of 42,000 gal. per hour, and a 22x14x20 piston pump, with a capacity of 48,000 gal. per hour. In the course of a few hours these pumps were on their way to Jeddo by express. They were installed immediately.

In the meantime the steam pumps on the upper level were kept operating 24 hr. per day. So great was the influx of water, however, that even when the larger pumps had been installed, it required six weeks of pumping with the entire equipment to force the water low enough to permit of the installation of the large Cameron steam pumps nearer to the lower level. Then it required another six weeks to recover the pumps and equipment installed in the flooded level. These pumps, after they had been cleaned and oiled, started up promptly and worked as well as ever, even though they had long been submerged owing to the break in the canal.

The foregoing can give but a slight conception of the tremendous work involved in recovering this mine. Some idea of the enormous quantity of water that had to be pumped may be gained from the fact that the two large Cameron pumps mentioned above had a combined normal capacity of 2,160,000 gal. per day. It required the constant operation of these two pumps and a number of others for three months to reduce the level of the water to a point where operations could be resumed.

This was an unusually difficult pumping problem, and in no small measure its successful solution may be ascribed to the remarkable performance of the pumps employed. In spite of the severe service conditions then encountered, these pumps have been operated more or less continuously for the last 14 years in the various mines of the Markle company. They are now installed in mine No. 6 and are giving good service.

*A. S. Cameron Steam Pump Works.

The U. S. Geological Survey

By George Otis Smith*

Success finds its best expression in the wonderful growth of the coal industry in this country. Yet those annual increments, measured by tens of millions of tons, have been only the aggregate of small increases in output countrywide in distribution. In a similar fashion, any success the U. S. Geological Survey may claim in service rendered the coal-mining industry must be simply

*Director, U. S. Geol. Survey, Washington, D. C.

the sum of several items extended over three decades.

First of all, our knowledge of the nation's fuel resources is naturally largely the work of federal geologists. When in May, 1908, President Roosevelt assembled the first National Conference on the Conservation of National Resources, a national coal inventory was submitted by the U. S. Geological Survey. Between the issuance of the call late in December, 1907, and the time of the meeting, these estimates of the coal resources of the United States were prepared by M. R. Campbell, and a map of the coal fields of the United States engraved ready for distribution. For the Twelfth International Geological Congress, which met at Toronto in 1913, the estimates were revised and the map redrawn. In the later report, published in the "Coal Resources of the World," the estimates are increased by 1,289,300 millions of tons for the coals below the bituminous rank, and by 342,000 millions of tons for the bituminous and semibituminous ranks, the aggregate being an increase of 1,631,300 millions of tons. These increases largely represent the added knowledge due to five years' intensive field surveys in the West.

The field methods developed by this Survey in the course of its examinations of undeveloped coal regions are now adopted by mining geologists for such surveys in different parts of the world. The Geological Survey was, I believe, the first to use the contour method for showing the underground topography of coal beds and to publish convergence sheets for use in determining the depth of beds diverging at a low angle to the exposed strata.

Since 1902 this field service has surveyed all the accessible coal fields in Alaska, has examined the high-grade Matanuska and Bering River fields, has outlined the coal-bearing areas and the attitude of the beds and has determined the physical and chemical characters of the coals so far as the exposures permitted.

The greatest body of standardized analytical data accompanied by efficiency determinations, and the results of coking, briquetting tests, etc. ever built up by any governmental or other organization to show the qualities of the coals of a country was begun by this survey, whose Technologic Branch was later reorganized by Congress as the Bureau of Mines.

The statistical work of the Division of Mineral Resources, which was inaugurated in 1882, has been conspicuously successful. In presenting the annual statistics of the production of coal and coke, the Survey has not only accurately recorded the progress of these industries, but has kept the public informed of trade conditions and the influences which have affected prosperity or depression. The value of the Survey's statistical reports to the trade has been recognized, not only by the various industries at home, but also by foreign students of economy, who have testified to the superiority of the statistical work of the U. S. Geological Survey.

The Sturdiest Youngsters You'll Ever See.

Success

Written
Expressly
for
COAL AGE
By
BERTON BRALEY

* * *

Watching the Bank Account Grow Fat.

SAID THE MINER, "I've worked as a fellow should,
And honestly labored for livelihood;
I've toiled deep down like a human mole
And mined my share of the good black coal;
In working hours I have kept awake
And taken no chances I shouldn't take;
I've seen my duty and done it—pat—
And I guess I've made a success of that.

"I married a girl who was square and true
(And that was a sensible thing to do),
For she's made our cottage a cozy nest
And borne me five of the finest, best
And sturdiest youngsters you'll ever see,
And so, as the head of a family,
I feel some natural pride thereat—
And I guess I've made a success of that.

"I never was strong for the doubtful joys
Of batting around with the other boys
And coming home drunk with my cash all spent
That should have been kept for the grub and rent.
No, I've tried instead to put away
A pretty good share of my hard-earned pay,
And—watching the bank account grow fat—
I guess I've made a success of that.

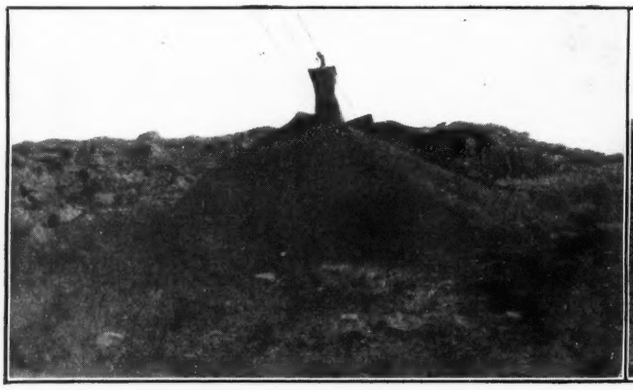
"I'm doing my labor the best I know,
And I may be a boss in a year or so,
And I'm happy at home with the kids and wife
And playing my part in the game of life,
For I've got my health and a bit put by
And I look at the world with a fearless eye.
So, thinking it over the best I can—
I guess I'm a pretty successful man!"

Waste Coal Disposal by Means of an Aerial Tramway

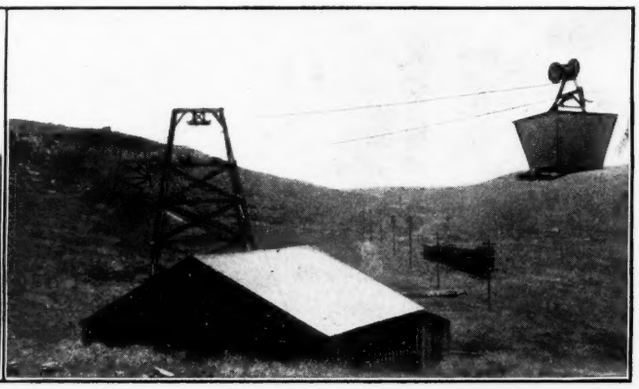
At the mine of the Montana Coal & Iron Co., Washoe, Mont., it is necessary to dispose of many tons of waste daily. This waste is really fine coal, for which there is no market in that locality. As within a short time this slack catches fire from spontaneous combustion, it is necessary to dump it somewhere where it will cause no damage to property. Until a few years ago, it was loaded into railroad cars and dumped at a convenient siding. This was quite expensive, and the company began to look around for a more economical method of disposing this material.

After considerable investigation, an aërial tramway was installed. This is of the two-bucket or "jig-back" type, and was built by the Broderick & Bascom Rope Co., of St. Louis, Mo. The tramway is 1200 ft. long, spanning a gulch to a high point on an adjacent hill. The maximum dumping space is thus secured. The capacity is 25 tons per hour.

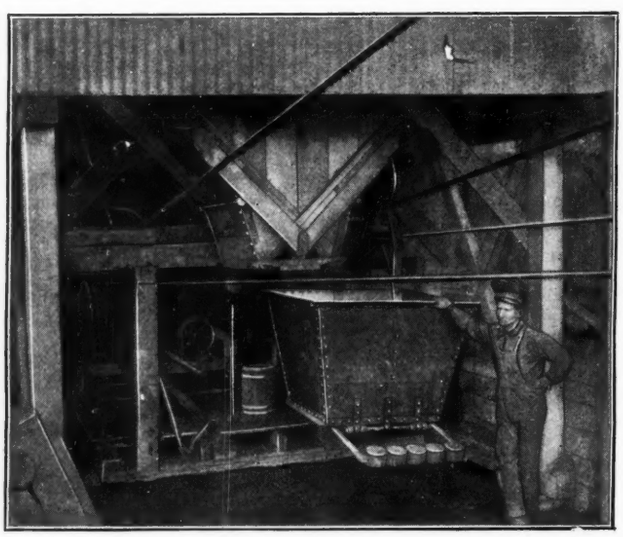
The buckets have a capacity of 40 cu.ft. and are self-dumping and self-locking. They are propelled by means of a ⅝-in. endless rope, making two half laps around rubber-lined driving sheaves. A 15-hp. motor furnishes the power required. Only one attendant located at the loading station and controlling the gates for filling the buckets as well as the power to and speed of the line is required. Dumping is accomplished by means of aërial trips fastened to the track cables. These may be moved from time to time as may be desirable. This tramway has been in successful operation for several years, and has proved an economical solution of the waste-disposal problem.



BUCKET DISCHARGING CONTENTS



GENERAL VIEW OF TRAMROAD



THE LOADING STATION

Money and Position Are Not Always Success

BY GEORGE N. LANTZ*

There was a man who had the faculty for making money. Midas-like, whatever he touched turned to gold. His wealth increased with every effort, every investment. He was very rich and possessed all the money he desired, but the man knew he was a failure.

After a time he decided that he would spend his money for things that could be seen and known. He bought property; he bought fine houses, and in them he placed beautiful furniture, pictures, tapestries, sculpture. He endowed schools and colleges, and he became known as a liberal man. But all the time he knew he was a failure.

Partly because he was wealthy, partly because he was young and handsome, and partly because he was educated and refined, the man became an idol of society. The doors of the most exclusive homes were opened to him; he joined clubs, was found at parties and at dinners. He was very popular, but he knew he was a failure.

One day he sat down and took a careful inventory of himself. He said: "I have money, property, position, yet I do not measure up to my own idea of success. Some men possess all these, and yet are successful. Other men are successful, and possess none of them. Why am I a failure?"

"Because," he answered himself, "I have forgotten that self-preservation is class-preservation; that self-success is class-success. I have forgotten that when my gain means another's loss we both lose, and that when my gain means another's gain we both gain. Every man can be successful if he helps others to succeed; no man can be successful at another's expense."

"Then," said he, "I will follow this rule: I will acquire nothing tangible at the expense of my fellowman."

The man is now a success.

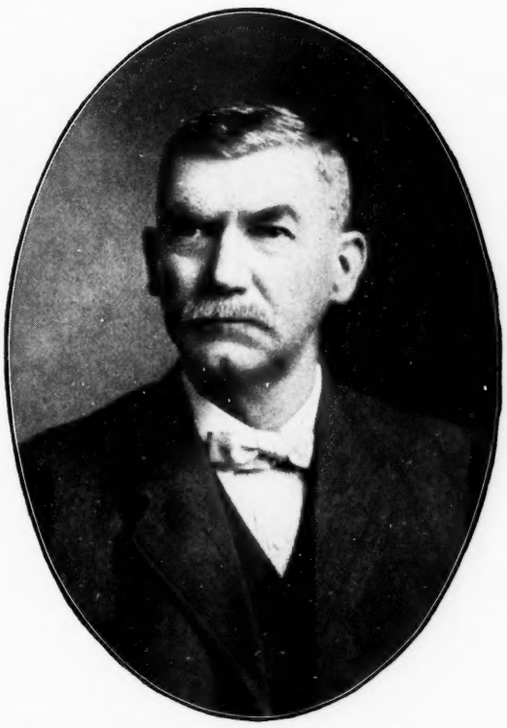
*New Straightsville, Ohio.

P. J. Rogers

It is an axiom of business that the man who is able to manage his own affairs well will be successful in directing and handling the affairs of others. Such men are always in demand and generally at the helm.

Down in Alabama the coal-mining business has produced a good many men of this type. Recognized among the foremost of these for his ability and sterling worth is P. J. Rogers, of Ensley, at present associate superintendent of the Wylam Division of Coal Mines for the Tennessee Coal, Iron & R.R. Co.

Mr. Rogers is one of the few men whose service with the Tennessee company is as old as the company itself, so far as its operations in Alabama are concerned. Born in Elmore County, Alabama, Nov. 22, 1856, his entry into the mining industry began in 1878, when he entered the



P. J. Rogers of the T. C., I. & R.R. Co.

employ of the Eureka Mining Co. at its coal-mining plant near Helena, Ala. This concern, by the way, at one time owned and operated the old Oxmoor Furnaces, near Birmingham, famous in the industrial history of Alabama. Fortunately for the mining industry Mr. Rogers stuck to this end of the business, and in 1882 transferred his allegiance to the Pratt Coal & Iron Co., then developing the famous Pratt seam near Pratt City, Ala. About that time the Pratt company began the leasing of convicts from the state for the operation of one or two of its new mines, and Mr. Rogers was made warden and given the management of these people.

In 1886, the Tennessee Coal, Iron & R.R. Co. entering Alabama and acquiring the ownership of several companies in the district, among them the Pratt Coal & Iron Co., assumed charge of Pratt mines. The plan of leasing convicts being continued, Mr. Rogers was made manager of prisons. From that time until 1912, when the company voluntarily relinquished the employment of convicts, he remained in charge of this department, handling it so successfully as to earn the distinction of being the best posted man in Alabama on convict affairs. To him is due the credit for inaugurating the task system adopted by the State Convict Board early in his régime, by which the men were classified according to physical ability, and the amount of work or number of tons the various classes were required to mine was fixed.

The wisdom of his judgment in fixing the task on a correct basis has been fully demonstrated by the fact that this has never been changed or deemed excessive and remains the standard to this day. Mr. Rogers' opinion on convict matters was always sought by the state officials. It is a high testimonial to his successful administration of this department that the working and welfare of convicts on the part of the Tennessee company were always considered a model for other concerns in the same business. In other words, his management of this difficult task stood every test for a period of over 25 years.

In November, 1895, Mr. Rogers was appointed superintendent of the Pratt Mines Division, embracing 8 or 10 mines and several coke-oven plants and coal washeries. In this position he succeeded Erskine Ramsay, who became at that time chief engineer and assistant general manager for the Tennessee company. With the exception of a few minor changes in the division arrangement and name, Mr. Rogers has remained in charge of that department until the present time.

During the period covered by his service with the company, Mr. Rogers passed through several changes in management as the result of various interests assuming control of the old Tennessee Coal, Iron & R.R. Co., which, prior to its purchase by the Steel Corporation in 1908, was known as the "Football of Wall Street." Without doubt it could be said in absolute truth that in all these changes no executive head ever thought of trying to do without "P. J.," as he became known to his more intimate associates, for he was so quietly and unobtrusively successful in performing his work, and his solid reputation for character and integrity made him virtually indispensable to the enterprises with which he was connected.

Two dominant factors have contributed to his success—character and hard work. As for work, it was often said of him that he could nearly always be found on the job before starting and after quitting time. His character is of the cast-iron kind, solid and enduring. In his long service he has formed the acquaintance of thousands of individual mine workers, many of whom in the past have been out on strikes, but all of these men are now nevertheless his loyal friends and supporters.

He has always taken an active interest in public affairs, having served at one time as alderman of the Greater City of Birmingham. He is the kind of a man whose word is absolutely as good as his bond, and his bond would be worth a good deal, for as we said in the beginning, he has managed his own affairs as well as he has those of his employers. Such men are always in demand and will always be a definition of Success.

Hate never made a success of anything but war—and that is a kind of success of which the world is growing very weary.

Some Successes in Rock Drilling

By Charles C. Phelps

SYNOPSIS—The Jackhamer drill is of recent introduction in the coal-mining industry; but as it had been serving a long apprenticeship in metal mines, it proved its adaptability to coal-mine work without any further change, and its adoption as an adjunct to colliery work is rapidly spreading.

Three years ago the Jackhamer was unknown to the American coal miner. Today thousands of these little tools are in use in all branches of the coal industry—development work, shaft-sinking, stripping, driving gangways and cutting out seams of coal. They are also performing a multitude of other operations requiring the drilling of rock or coal. In this brief interval the Jackhamer has established for itself an enviable reputation in both the anthracite and bituminous fields as a mining tool of exceptional utility and efficiency.

Houston Collieries Co.'s Shaft at Carswell, W. Va.

It is probable that the miner first came to appreciate the value of the Jackhamer in connection with shaft-sinking. Some of its best records have been made in work of this character, and it is now looked upon as almost a necessity for this purpose. It works close up to the walls, keeping the shaft true to the required dimensions. It starts to operate without delay, whereas, in a crowded shaft, the mounted type of drill probably requires as much time to set up and adjust as is needed for the actual cutting. The steady rotation of the steel, the rapid blows on the drill and the constant blowing of the exhaust through the hollow steel, which keeps the drill hole free of cuttings, all tend to produce rapid penetration and to avoid troublesome delays.

Sunk 61 Feet of Shaft in 17 Days

The records of performance best illustrate the successful achievements of the Jackhamer. A few typical cases follow. At the Bellevue Mines of the Delaware, Lackawanna & Western R.R. Co. coal department, Mike Hoban, a contractor, sunk 61 ft. of shaft of dimensions 12x14 ft. in hard sandstone rock in 17 days, working three 8-hr. shifts daily and using only one Jackhamer. This machine was in almost continuous operation, averaging 280 ft. of hole drilled per shift.

Dolan Bros. recently sunk a shaft 15x16 ft. at the mine of the Lytle Coal Co., near Minersville, employing two Jackhamers for that purpose. In four months' time, working through ground varying from very hard material to slate, they sunk 359 ft. of completed shaft, including timbering. There were three 8-hr. shifts per day and six days' work per week. These contractors say: "We have sunk many shafts of this approximate size with mounted piston drills, but never made the progress we have made in this one." The progress in the case cited figures to about 90 ft. per month. Their best previous record, using other types of drills, was about 61 ft. per month. They evidently entertain hopes of exceeding even this figure, for they state further: "If we had installed a sharpener at this job when we started it, instead of sharpening by hand, we believe we would have exceeded this footage."

Shaft Completed in Three Months and One Week

Another interesting report is from Walter F. Patterson, Jr., of Pittsburgh, Penn. He sunk a shaft at the Houston Collieries Co.'s operation at Carswell, W. Va. The size of the shaft for the first 18 ft. was 30 ft. 4 in. by 22 ft. 4 in. Below that level it narrowed to 24 ft. 4 in. by 16 ft. 4 in., and continued with those dimensions till it reached the bottom at 253 ft. The monthly progress was as follows:

March, 1914	96 ft. excavation, 58 ft. timbering
April, 1914	86 ft. excavation, 53 ft. timbering, 1 water ring
May, 1914	54 ft. excavation, 109 ft. timbering, 1 water ring, 270 cu.yd. concrete
June (8 days), 1914...	17 ft. excavation, 33 ft. timbering, 4 strings, guides, brattice and stairs

Three Jackhamers were employed per shift on an average. The weekly average was 18 ft. of completed shaft.

In Stripping Work Steam Can Be Used as Furnished by Shovel

In all of the work previously referred to, the Jackhamers were operated by compressed air. They work almost equally as well on steam. This feature is particularly desirable in coal stripping, as the Jackhamers can be run by steam furnished by the steam shovel used in stripping. During some observations on the use of steam-operated Jackhamers for coal stripping in Kansas the operator drilled 14 one-foot holes in the sandstone cap rock in 20 min. In the coal bed, which is 4 ft. thick, several 4-ft.

blast holes were drilled, the average time for completion being 3 min. each, whereas it required an average of 20 to 30 min. to accomplish the same result by hand. The exhaust steam kept the hole as clean of cuttings as if compressed air had been employed.

Using the Hammer Drill in an Electrically Operated Mine

The development of the electrically driven mine-car compressor has greatly broadened the field of usefulness of pneumatic coal-mining machines for underground operations and this applies especially to the Jackhamer.

Driving Gangway with Jackhamer Drill, Hollenbach Colliery, L. & W.-B. C. Co.

The mine-car compressor was described somewhat at length in the Dec. 12, 1914, issue of Coal Age.

Several other electrically equipped mines are adopting the same method for drilling blast holes in both rock and coal. It is a simple matter to move such units from place to place in a mine wherever they may be needed. They are run over the regular mine tracks, derailed wherever desired and placed to one side. It is a simple matter to connect them up electrically, and they require little attention to operate, being self-regulating, self-lubricating and having a hopper type of water-jacket that requires refilling only at intervals of several hours. The compressed air leaves the compressor in a somewhat heated state, which is a source of economy and avoids all necessity for a reheater.

Serves Well for Drilling Coal

There is scarcely a substance known that the Jackhamer will not penetrate with ease—from the hardest granite to the softest coal. The same steel may be used for penetrating different materials, although larger-diameter steels are usually employed in drilling coal. "The Jackhamer is capable of drilling in either coal or rock, which makes it a much handier tool around a mine than the ordinary coal auger," writes W. B. Earnest, of Cordova, Ala., who has been using the Jackhamer in the Indian Head Mines.

He continues: "It is so far ahead of the coal auger as to make the odds ten to one. In using this Jackhamer drill you do not know when you strike a sulphur ball, whereas with the coal augers you readily know it, as you will have to replace your auger because the points break when the sulphur ball is encountered." In boring coal for blasting Mr. Earnest uses a 6-ft. steel with a bit of large diameter and runs it straight in without changing steels and without any support for the Jackhamer other than the hands of the operator.

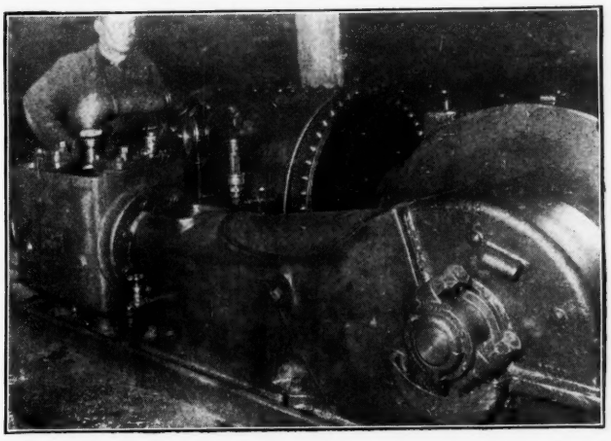
Two Feet of Hole per Minute in Hard Coal

In the St. Clair Division of the Philadelphia & Reading Coal & Iron Co. the Jackhamer was observed to drill very hard coal at the rate of 2 ft. of 2-in. hole per minute, using twisted steel and a 1¾-in. sheep-nose bit. This type of bit worked without raising any dust, which was particularly appreciated by the drill runners.

In telling of its experiences with the Jackhamer the Rex Coal Co., of Kitts, Ky., states: "We have a hard sandstone top and with this drill we can put up a 6-ft. hole in from 15 to 18 min. Before we got this drill we were paying $4 per yard for entry work; now we pay $1.75 and drill the rock, which makes a total cost of less than $2 per yard. The Jackhamer is the finest thing we have ever seen in the way of a drill. One man operates it and doesn't use any support for it at all."

Drills without Mounting

The few cases cited in the foregoing paragraphs will enable one to appreciate the reasons for the success which the Jackhamer has achieved in coal mining. The ordinary mounted drill would be quite out of the question for drilling blast holes in coal, for more time would be wasted in setting it up than in drilling. The Jackhamer, on the contrary, can be kept cutting nearly one hundred per cent. of the time if desired. For the same reason it has



An Ingersoll-Rogler Electrically Driven Compressor

supplanted the mounted type of drill for cutting rock and is used for this purpose in many coal mines.

It strikes many hundred blows per minute, which is the principal reason for its great cutting speed. It is a popular tool with the miners not only because it enables them to increase their production but also because it is an easy matter to manipulate it. Weighing only 40 lb., it is as easy to use in drilling a "flat" as in sinking a "down" hole; and in fact it is occasionally used for drilling "up" holes. The Jackhamer requires little physical effort on the part of the runner, as it is merely necessary to apply it to the desired spot and guide it as it cuts. The Jackhamer drill is manufactured by the Ingersoll-Rand Co., of New York City.

The Stonega Coal & Coke Co.'s Operations in Virginia

By Martin Prehn

SYNOPSIS—The story of a 20-year-old success. This is only another instance of the value of considerate treatment on the part of the company for its men.

The operations of the Stonega Coal & Coke Co. are mainly in Wise and Lee Counties, southwestern Virginia, and in Harlan County, eastern Kentucky, and include the communities of Stonega, Roda, Arno, Osaka, Imboden and Keeokee, in Virginia, and of Clover Fork, in Kentucky. Eighteen coal mines, with an average annual production of 5,000,000 tons, and four coking plants—at Stonega, Imboden, Osaka and Keeokee—the production of which is controlled to fit the market, are operated at these seven points and are in direct rail communication with the big coal centers via the Louisville & Nashville R.R., the Virginia & Southwestern Ry., the Norfolk & Western Ry. and the Carolina, Clinchfield & Ohio Ry.

This is one of the coal-mining companies that has given material form to the realization that the physical and social welfare of its employees may have a direct effect on its organization for good or evil. Embraced in this was the erection of attractive four-room dwellings for workmen. One of the photographs reveals the reasons for their popularity. They are neatly fenced in, with their complements of cow-barns, coalhouses and outhouses. The general welfare of each community is safeguarded by careful considerations of sanitation and water supply and through the establishment of schools and churches. The water service is handled directly by the coal company, and since every drop is pumped from deep wells there is little question as to its purity.

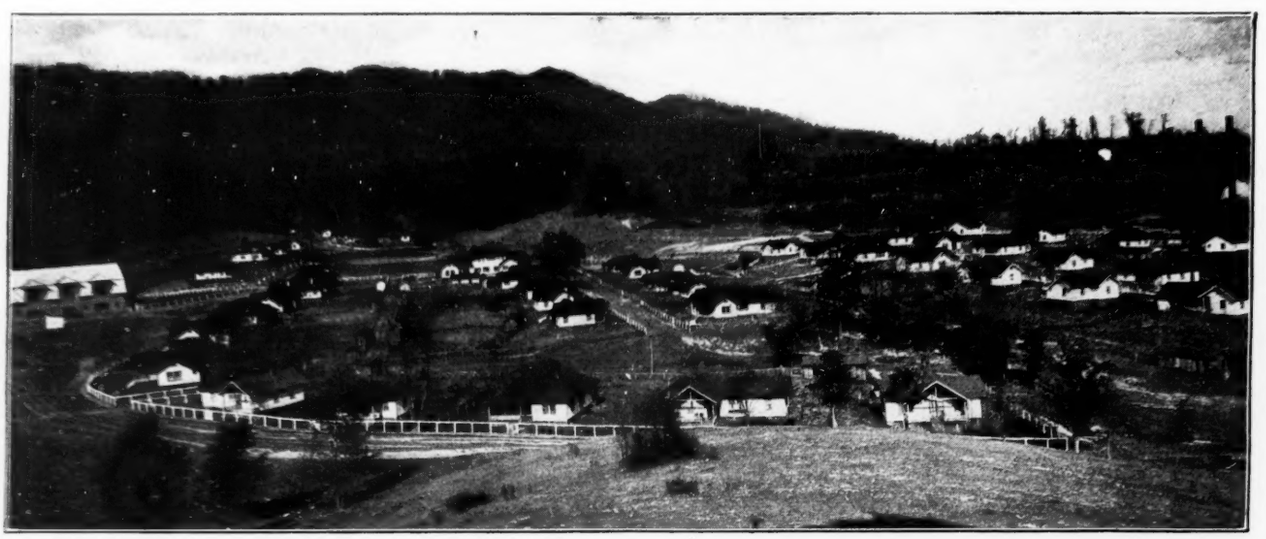
A modern, well-equipped hospital has also been erected, but on account of the general good health of the inhabitants its usefulness is confined almost entirely to unavoidable accident cases.

Welfare Work Pays

Can there be much doubt that the spirit of workmen and their families—their attitude toward their employers and company property—is elevated to a high level of loyalty when so much of the purely business side of the question of employment is transferred to the account of physical and mental wellbeing?

The value—the actual money value—of intelligent welfare work along such lines is demonstrated by the entire absence of strikes or other disaffection in the history of the Stonega Coal & Coke Co.

It requires a progressive spirit, an up-to-the-times organization, to foresee the great return that indirect investments of this nature are sure to create. And where this tendency is evident it generally extends to mechanical equipment also. Therefore, despite the 20 years of healthy existence that the Stonega company has enjoyed, the entire mechanical plant bears the stamp of modernity.



A Model Town of the Stonega Coal & Coke Co.

Coal is taken from two beds—the Taggart seam, which averages 6 ft. 6 in. in height, and the Imboden seam, which runs about 7 ft. Virtually all coal is undercut by electric mining machines before being "shot down," and is then moved to the mouth by electric gathering and main-line locomotives. It may be seen from the photograph of a room that the thick beds release a clean, lumpy product. This simplifies production immeasurably, and the larger part of the process resolves itself into a question of transportation. It follows then that the largest item of electrical expense is in haulage cost.

The progressive spirit of the Stonega company was attested recently by the announcement in the trade journals of the closing of a contract with the Electric Transmission Co., of Pocket, Va., for the supply of all electric current for every one of the 18 plants of the company. So drastic a change, fostered by a company whose farsightedness and engineering ability are widely known,

A Row of Miners' Houses

Loading Coal at Room Face

will arouse much general interest among mining men; and therefore one phase of economic management, which involves the consumption of much electrical energy, will probably prove especially interesting.

Experience, covering a period of many years, long ago led to an appreciation of the advantages of roller-bearing wheels for mine cars. Severe competitive tests revealed conclusively the economies obtainable with the best of such equipment. It was found that a given locomotive could haul a train equipped with roller-bearing wheels over a given piece of track in one-half the time and with half the power consumed in hauling an identical train equipped with plain bearing wheels. In addition thereto the enormous savings in lubricant effected by enforced economical lubrication and the fact that additions of fresh lubricant were found necessary only once or twice a year pointed toward operating economies of great magnitude from such wheels.

This naturally led to a series of competitive tests of a great variety of roller-bearing wheels, from among which the Enterprise wheel, of the Enterprise Foundry & Machine Co., of Bristol, Va.-Tenn., was finally chosen. That was three years ago. Since then all new cars, and old ones as fast as they went through the shops for repairs, were fitted with these wheels.

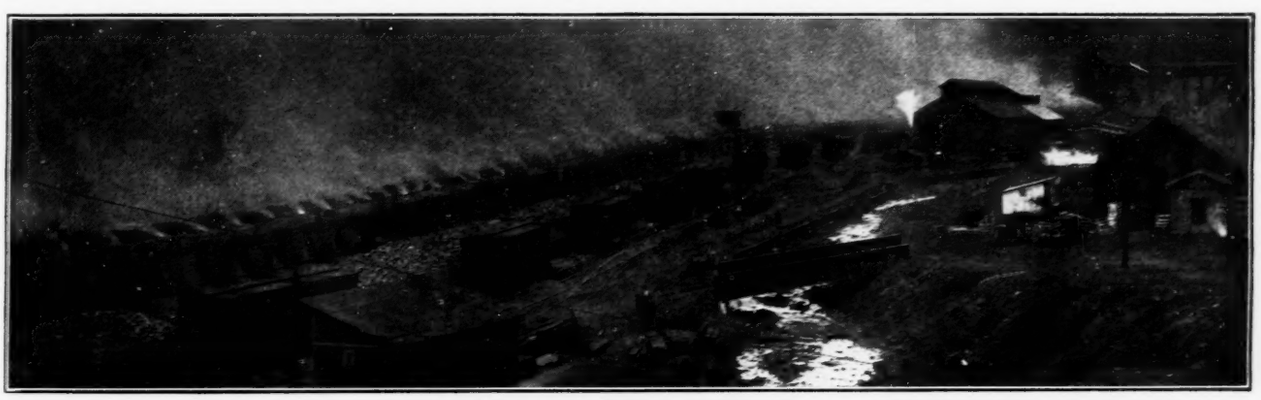
Other "home" activities that impress one with the progressiveness and initiative of this company are to be seen at every hand. A unique device designed and built in the company's shops enables one man at the tipples to run 2000 tons of coal through a rotary dump in 10 hours. A "barney-block" has been perfected for use on inclined planes which utilizes the same track as the mine cars—this is another evidence of intensively progressive and profitable use of equipment.

The coal produced by the Stonega Coal & Coke Co. is extensively known for its uniform heat value and freedom from excessive ash, and the coke made in its ovens—Wise County coke—is used in great quantities by foundries and furnaces in convenient rail communication with the company's mines.

This is the brief story of a 20-year-old coal-mining success; and the greatness of this success is attributed to progressiveness and fellow-feeling.

Water Hyacinth Briquettes

The director of the prison at Pnompenh, who has made a careful and thorough study of the subject, is authority for the statement that since April, 1911, the water hyacinth, which grows in such profusion in many streams as to seriously impede navigation, has been dried, compressed into briquettes, and used as fuel at Khartum and other points on the Upper Nile. These briquettes can be put on the market there at $6 (gold) per ton, and it is said that tests made on a steamer on the White Nile have demonstrated that their efficiency as a fuel is exactly equivalent to that of an equal amount of the best coal.



A View of Ovens and Coke Yard

There are plenty of recipes for success, but the only ones that are any good contain work as the principal ingredient.

In plastering a brattice or overcast use nine parts yellow clay and one part mule manure. Examination of the brattice months afterward will show that it is still moist and will not crack open.

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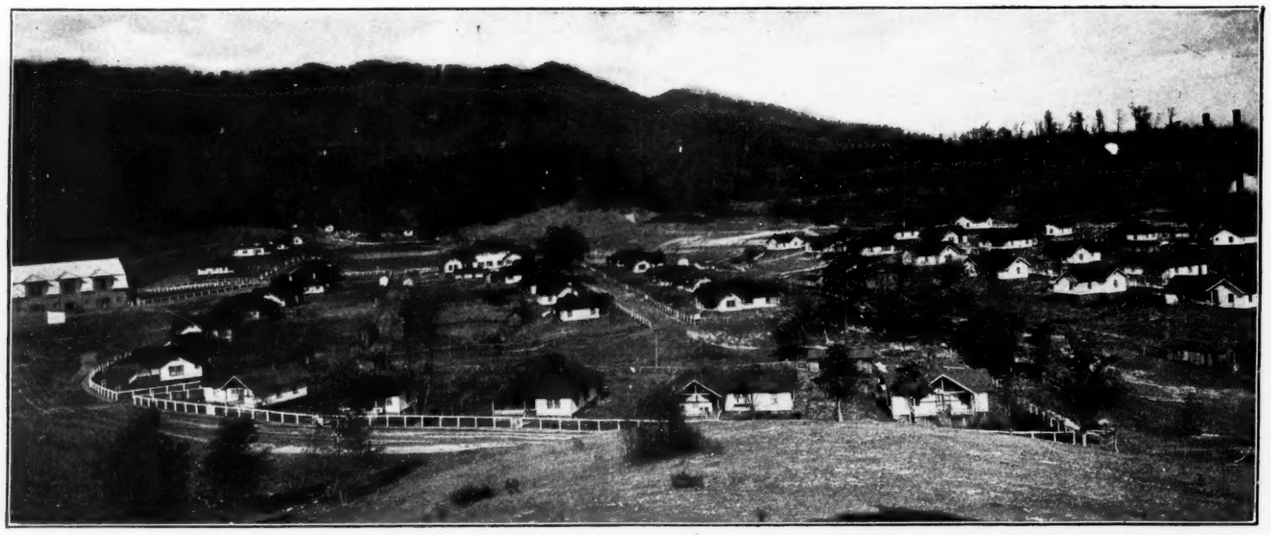

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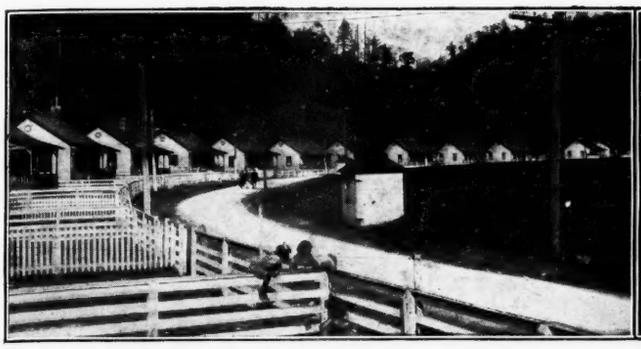

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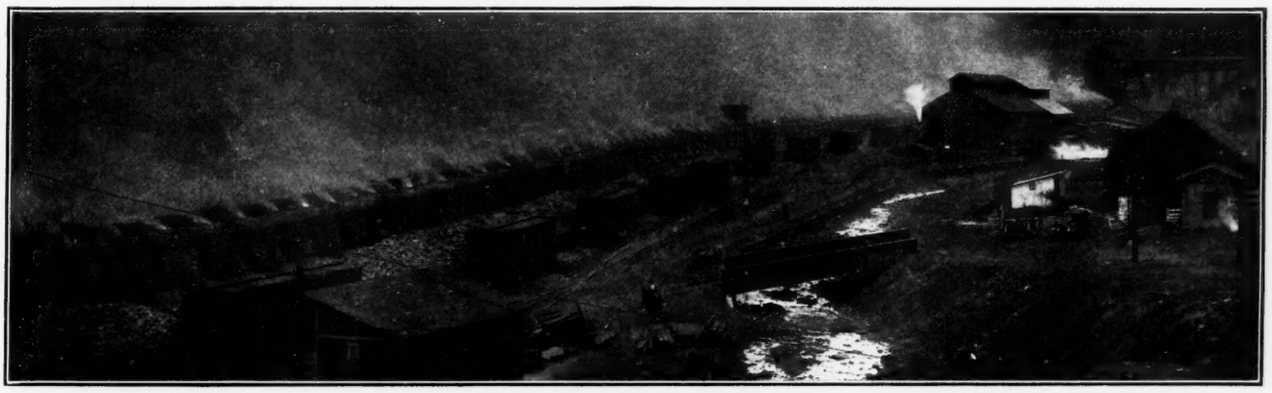

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A Real Success in the Pocahontas Field

By Flat Top Engineer

SYNOPSIS—The story of how modern ideas converted a positive mine failure into a successful operation. This case shows the beneficial effect of decent surroundings on the efficiency of company employees.

The line of demarcation between success and failure is often indiscernible. Sometimes it happens that the policy which, to everyone but the man who is behind it, looks as if it would precipitate the concern into a quagmire of bankruptcy and financial disgrace will, if carried to its logical conclusion, result in a colossal success.

I have observed many instances of this, but the one which has left upon my mind the most vivid impression occurred at a mine in the Pocahontas field.

For many years after the mines adjacent to this one had been shipping coal it stood untouched. Expert engineers had reported unfavorably concerning its development. The coal was low and dirty and the royalty high.

Finally an adventurous spirit, the success of whose sales agency had inspired him with the desire of conquering in the producing realms of mining, undertook its development. He visited all the nearby mines, took in the details of their general construction and layout and installed a plant true to the best traditions and practice, as he had gathered them from his tour of observation and from his advisory engineers.

In due time a satisfactory output was obtained, but here the mine vindicated the opinion of the examining engineers and refused to pay. The cost of production was high because of the thinness of the seam, and the price obtainable was low because of its dirty quality.

A Long Struggle

But the owner was game. For five years he devoted the profits of his sales agency to taking care of the deficit of the mine, which was accomplished with the assistance of an occasional mortgage on the property itself. But during the dull times of 1908 the sales agency, which had been hard hit by the panic of the preceding year, found itself unable longer to bear the financial burden of keeping the mine in operation, so it was sold to its creditors. They did not want it; but as it was the only tangible thing their money represented, they had to take it.

The man whom they appointed as manager was in many respects unusually well qualified for the position. He had a well-grounded knowledge of the technical details of both mining and plant construction, and—what was of vastly more importance—he had a thorough understanding of human nature and was a positive genius when it came to grasping the underlying elementary principles of a problem. If a man, a machine or a method did not function, he possessed to an unusually high degree the knack of divining just what was fundamentally wrong.

The purchasers of the mine had little or no confidence in the object of their purchase, but they had perfect confidence in the manager; so after he had studied the situation and asked for a large appropriation to be expended in improvements it was ungrudgingly granted. The first problem that he had to solve was to improve the quality of his product. This he did by the installation of a tipple and washer constructed along modern scientific lines, the first of its kind to be installed in the Pocahontas field. The product obtained set a new standard of excellence in Pocahontas coal and was such as to satisfy the demands of the most fastidious.

The first problem was solved; the second, and clearly the more difficult one, awaited his attention. This was the reduction of the cost figure.

Reducing the Mining Cost

As all mining men who have ever attempted it know, any change to more progressive methods is vigorously combated by adherents to the old order. This was especially true in the instance under discussion, but eventually in the face of bitter opposition from the miners the most uptodate electrical and mechanical equipment was installed throughout the mine. The pick was discarded for the mining machine, the mule was replaced with the electric gathering locomotive, and the trapper-boy abdicated in favor of the automatic door. Wherever it was possible for machinery to take the place of manual labor this was effected.

But this alone did not solve the problem. To have an efficient machine one must have an efficient man to operate it. How, then, must he attract to his plant, or develop and keep there as part of his permanent organization, men of good habits and sufficient intelligence to take care of and to operate on an efficient scale this large amount of machinery?

The personnel of his organization was at that time of as high an order as that of any of the neighboring operations, but this did not suffice. He realized, as did Henry Ford, that if one would excel in the production of an article he must have super-average producers, and here his knowledge of the fundamentals of human nature asserted itself. He knew that if given the same men the other fellow had, he could, with the aid of better living conditions, more generous treatment and more attractive surroundings, develop them into more efficient workmen.

With this in mind he set out to build a mining town so radically different from any of its neighbors and so entirely out of keeping with the building traditions of the Pocahontas field as to be a continual source of surprise and astonishment to the occasional visitor from other camps.

All of the buildings that had been previously erected were either torn down or remodeled; the building ground was laid out in broad streets and generously sized lots. Conveniently planned, neat-appearing and well-constructed houses were erected, well back from the street lines so as to afford a good sized front yard, which was grassed and set with ornamental trees and shrubs. In the rear of each house was a vegetable garden, usually 100x50 ft., the whole inclosed with a neat, substantial

fence. Pure spring water was furnished to each dwelling, and poultry houses and cow stables were provided for the use of the tenants. Rent was reduced out of all proportion to the prices charged by neighboring operations, and prices in the company store were reduced to a competitive basis with independent merchants, and uniformly courteous treatment was accorded all customers.

The reader who may detect nothing unusual in these things must remember that this was some years ago; that it was in fact, though never advertised as such, pioneer welfare work in the Pocahontas coal fields. Other operations have been and are following rapidly in its lead. The reason they are doing so is because this instance has proved beyond a doubt that it pays good dividends in dollars and cents.

Yet there were those—and they were not in the minority—who held that the management was simply throwing good money after bad and that the result would be another forced sale. But time has demonstrated that each step was absolutely essential to the concern's financial success and that had the policy of improvement stopped short of its final perfection these pessimistic prophecies would have been fulfilled.

All this leads me back to my opening remark—that the difference between a successful and a ruinous policy is not always apparent to the onlooker, but that in this instance a judicious investment in human welfare spelled success.

⁂

Success in Rail Bonding

By G. H. Burge*

SYNOPSIS—Constant inconvenience and expense due to poorly bonded mine track led to the invention of a rail bond that required no drilling in the rail web, no pressing-in of terminals and no driving of pins.

Some four years ago, through the aid of a large electrical manufacturing company of Chicago, I secured a position as electrician with the Northern Central Coal Co., of Huntsville, Mo. At that time this firm was operating two mines, known as No. 2 and No. 12. These were about three-quarters of a mile apart and were supplied with power from the No. 2 Mine. Direct current was employed, this being furnished by one 250-kw. Ridgway generator and one Goodman 100-kw. generator.

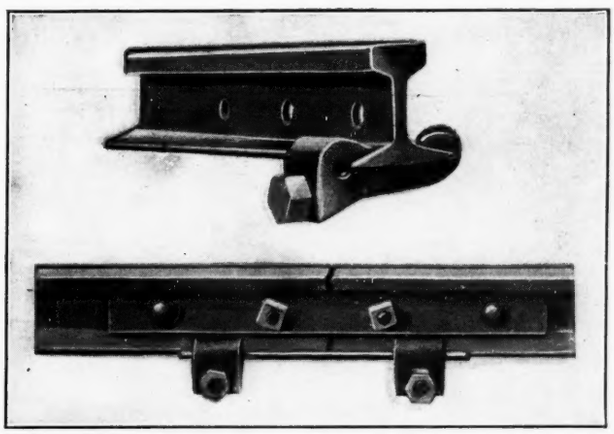
The grades in these mines were excessive, ranging from 1½ to 6 per cent., and not long after I went with this company it purchased a new combination rackrail locomotive in addition to the three 7-ton Goodman machines then employed.

The track in these mines was a fair specimen of mining practice, and the resistance of the track due to bad bonds caused an enormous current to pass through the motors, this being of course accompanied by a considerable drop in voltage.

On numerous occasions I have been called into the mine to a motor that had been stalled, and after going over the track and repairing the bonding or putting in new bonds succeeded in getting the motor to take its load to the shaft bottom. Almost every day motor troubles of one sort or another were experienced. These mostly took the form of burnouts of armatures, resistance coils or leads. I thought over the question of rail-bonding until I came to the conclusion that surely there should be some means of eliminating a part, and probably a large part, of the troubles to which we were subjected.

After considerable study I evolved what is now called the Economy rail bond shown in the accompanying illustration and had a few of these made up. Some of these bonds were put on the rails in wet localities and others where the road was dry. One was purposely attached to the track near the shaft bottom and so arranged that the whole amount of the current used in the mine had to pass through it on the return. These trial bonds proved so successful that I showed one of them to the general superintendent and told him of the results that they had attained. He examined it carefuly and assured me that it looked good, among its strongest points being the fact that no holes had to be drilled in the rail web and that scrap wire might be employed.

When motors were placed in No. 12 Mine the track was bonded with these bonds, a considerable number having been made up. The initial installation proved so successful that whenever the motor road was extended the bonding was done with Economy bonds, and they are today in use on over a mile of haulage road, giving excellent results and little trouble. They are inspected periodically about every four to five weeks.



The New Economy Rail Bond

Two years ago the track at No. 2 Mine was taken up and regraded, some of the low places being raised. It was relaid in part with new rail, all joints being bonded with Economy bonds. After this was done one motor was laid off, and the 100-kw. generator furnished abundant power where before it required the 250-kw. machine, which was then frequently overloaded.

As may be seen from the illustration, the Economy rail bond is extremely simple; since it requires no drilling of the rail and no pressing-in of terminals, it may be readily applied to either old or new track. The bonding element—which, as explained above, may be old or scrap copper wire—is down close to the base of the rail where it is out of the way of the wheel flanges and cannot be cut or otherwise injured even in case of derailment.

⁂

To carry hot babbitt metal in a mine, heat some small pieces of iron red-hot and drop them in the metal, which will keep it in a condition to pour for some time.

*Economy Rail Bond Co., Huntsville, Mo.

A Mine with a Haulage Schedule

By A. R. Anderson*

SYNOPSIS—In the mine of the Sterling Coal Co. the work of haulage is divided into gathering proper, trip making and main hauling, the first being performed by 2½-ton storage-battery locomotives and the other elements by trolley locomotives. To avoid delays the work has been carefully synchronized.

The fluctuating output from any one section of a mine makes it almost impossible to systematize the haulage of coal and the operation of locomotives so that a fixed time schedule may be even approached. Any variation from the old catch-as-catch-can basis of hauling coal is a departure from methods of long standing and a success of great interest.

The separation of coal mining into the several operations of undercutting, shooting and loading, uncertain elements such as water, faults, bad top, etc., the uncertainty of labor and a number of other like causes all militate against a definite labor schedule. Some of the more obvious causes have their source, however, in the fluctuating demand for coal. If the miners work steadily so that places can all be filled with men, if the miners know just when cars will be supplied some elements of fluctuation can certainly be eliminated.

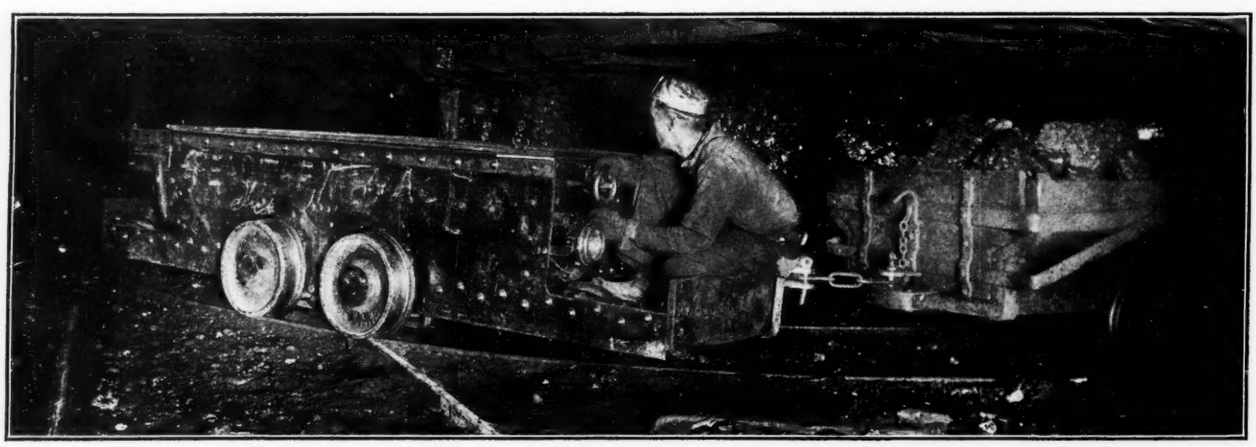


Fig. 1. Storage-Battery Locomotive Bringing Loaded Car Out of Room Neck

Haulage System Usually Divided into Gathering and Main-Haulage Elements

The system of haulage generally adopted at the present time where the workings are at all extensive can be divided into two parts—the gathering and the main-haulage elements. For gathering, live stock or locomotives of the cable-reel, storage-battery or "crab" type may be employed and the main haulage may be afforded by rope or locomotives. To subdivide the haulage elements further than this has not often been attempted, because mining is not intensive enough as to territory or regular enough as to output to keep more elements than this working up to capacity. In other words added elements would generally mean additional apparatus and more idle time for both the apparatus and its attendants, because of the difficulty in establishing a schedule to which all the elements could conform as before stated.

However, it is obvious that, no matter how many elements are employed, if a system of haulage maintained according to a fixed schedule could be established, the efficiency and reliability of the operation of the mine would be raised to a much higher standard. In some cases it has been found possible to establish such a schedule and adhere closely to it.

In one notable case, which it is the purpose of this paper to describe, it was found advisable to employ, for reasons of economy and reliability, three elements in the haulage system, one element consisting of storage-battery locomotives which handle the cars in the rooms and hauls on the entry in front of the rooms only, the second element consisting of a trolley locomotive which handles the cars from their position in the entry in front of the rooms to a parting on the main entry and a third element consisting of a trolley locomotive which handles the cars between the parting and the tipple. This system is used in the mine of the Sterling Coal Co., Ltd., at Salineville, Ohio.

The establishment of a systematic haulage schedule at this mine is largely due to the efforts of E. B. McNichols, chief electrician, and the success with which this system has been operated gives it an eminence which cannot be overlooked. The plan of the mine consists of a main entry, off which are driven 11 butt headings and there are from 12 to 15 rooms worked on each butt heading.

Five Trolley Locomotives and Eleven Battery Locomotives

The haulage equipment in use consists of one 8-ton Jeffrey trolley locomotive for the main haul, two 3½-ton, one 4-ton, and one 4½-ton Jeffrey trolley locomotives for the butt-entry hauls, and eleven 2½-ton storage-battery gathering locomotives used for handling the cars in the rooms. One of these was built by the Atlas Car & Manufacturing Co., and ten by the Jeffrey Manufacturing Co. The main haulage locomotive handles 36 cars per trip,

*Engineer with the Jeffrey Mfg. Co., Columbus, Ohio.

taking all the loads from, and placing all the empties at, a sidetrack along the main haul.

The butt-entry locomotives take the empties from the sidetrack in trains of 12 cars and deliver them to one of the 2½-ton storage-battery locomotives. Each butt-entry locomotive takes care of three butt entries.

Making Up a Butt-Entry Trip

When the butt-entry locomotive brings in a trip of 12 empties, this trip together with the 2½-ton storage-battery locomotive is pushed into a room. In the meantime the butt-entry locomotive makes into a train the 12 loaded cars which have been placed on the entry by the storage-battery locomotive. After the loaded trip is coupled up it is pulled down to the room where the empty trip and storage-battery locomotive are waiting and coupled onto them. The empty trip is then pulled with its battery locomotive out on the entry, after which the empty trip is uncoupled, the loaded trip taken to the parting by the butt-entry locomotive, and the storage-battery locomotive then proceeds to distribute the empty cars and push them to the face of the rooms.

The reason for pushing the empty trip into a room and pulling it out again with the trolley locomotive is to save the storage battery from handling the trip of empties while the trolley locomotive is on the entry. The twelve loads together with two other similar trips taken from two other butt entries are taken to the siding to make up a trip of 36 loads for the main-haulage locomotive.

The Schedule Adopted

With this system of haulage, a schedule is maintained approximately as follows: One entry produces 12 cars per hour. This means that the 2½-ton storage-battery locomotive in each hour places 12 empties at the face and takes 12 loads away to the entry leaving them just outside the room neck. When these loads have been placed on the entry, the butt-entry trolley locomotive comes along, leaves 12 empties and picks up the trip of 12 loads, taking it to the sidetrack.

This trolley locomotive comes into each butt entry once every hour, and inasmuch as it has three entries to take care of, there are 20 min. available for taking care of each entry. The main-haulage locomotive, handling 36 cars per trip, must make four round trips per hour, or a round trip every 15 minutes.

The average weight of coal loaded into each car is 2700 lb. and at a rate of production of 12 cars per hour per butt entry for 11 butt entries, the capacity of this haulage system is approximately 178 tons per hour. On this basis, the haulage capacity per day of eight hours, is 1424 tons.

Working Methods

This mine operates in what is known as the No. 7-A, or strip, bed, which has an average thickness of approximately 36 in. at this mine. The average grade in these workings does not exceed one per cent. and the maximum is less than four. The rooms are mined to a depth of 150 ft., spaced on 35-ft. centers and staggered on opposite sides of the butt entry. The distance between the first and last rooms worked does not generally exceed 250 ft.

These data give an idea of the conditions under which the 2½-ton storage-battery locomotives work, handling only one car at a time except when placing the empties. Then it is necessary to move the whole train of empties on the entry in front of the rooms until they are all placed.

The dimensions of the ten storage-battery locomotives built by the Jeffrey Manufacturing Co. are as follows: Track gage, 42 in.; overall width, 47½ in.; length over bumpers, 11 ft. 7 in.; overall height, 30 in.; wheel base, 24 in.; diameter of wheels, 16 in.

Description of Locomotives

The locomotives, one of which is illustrated in Fig. 1, have structural-steel frames and are designed for double-end control. The wheels are outside the frame, which is supported on spring journal boxes. Each locomotive has one motor designed to have a high efficiency for battery work, driving on one axle through a four-lead steel worm and a 34-tooth bronze worm wheel, housed to run in oil. A chain connects the axles. The locomotives are provided with swinging drawbars and band brakes on the armature shaft. The battery consists of 36 Type M. V. 9 Iron Clad Exide cells. A Sangamo ampere-hour meter, operating in conjunction with a shunt trip circuit breaker serves to open the circuit automatically upon completion of the charge.

At night one man takes care of the charging of all these locomotives. A simple charging panel with resistance

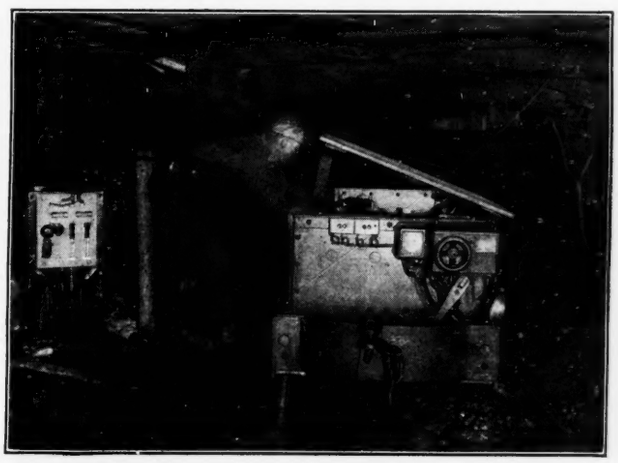


Fig. 2. Storage-Battery Locomotive Being Charged

coils mounted on the back is provided for each locomotive. On this, as seen in Fig. 2 which shows one of the storage-battery locomotives being charged, are mounted fuses, an underload circuit breaker and two switches which are used to vary the charging rate. Fig. 1 shows one of the storage-battery locomotives bringing a loaded car out of a room neck.

Formerly Gathered Cars by Man Power

Prior to the installation of these locomotives the cars were handled in rooms by pushers, three being required on each butt entry. Now the motorman on the locomotive is the only man required to handle these cars. It is estimated that the saving thus effected will amount to approximately $15,000 per year.

Locomotives of this kind with an over-all height not to exceed 30 in. and a wheel base and over-all length not too great to interfere with its operation on small-radius curves, are necessarily limited to 42-in. gage and over. Any smaller gage would necessitate increasing the over-

all height of the locomotive in order to secure proper battery capacity.

Comparison in Favor of "Middleman" Haulage

In conclusion, a comparison between this three-element and a two-element haulage system which might be used in its place, may be of interest. The capacity of each storage-battery locomotive in an 8-hr. day under the present system is 96 cars. If these locomotives were eliminated and the butt-entry locomotives provided with cable reels, to enable them to go up into the rooms to place the empties and pull the loads, a cable-reel locomotive would be required on each entry. The cost of a storage-battery locomotive, such as is used here, and that of a cable-reel locomotive, such as would be required, are practically the same.

With the two-element system, then, only 11 locomotives would be required as compared with 15 under the present system, saving the installation of four locomotives representing an investment of approximately $7200. Assuming depreciation and interest at 25 per cent., this investment costs approximately $1800 per year. On the other hand, with cable-reel locomotives, two men would be required on each locomotive, or a total of 22 men for 11 locomotives.

With the present system, only one man is required on each storage-battery locomotive and two men on each butt-entry locomotive, making a total of 19 men. At $60 per month per man, the present system thus effects a saving of $2160 per year, which more than offsets the interest and depreciation on the added investment. To this should be added the freedom from cable trouble and expense, freedom from the expense of more carefully laid and bonded track in rooms and the possibility of operating on a smaller generator equipment. Thus the economic advantages of this three-element system become evident. No doubt there are many operations where this plan, which has proven its advantages and economy at this mine, can be applied with equal success.

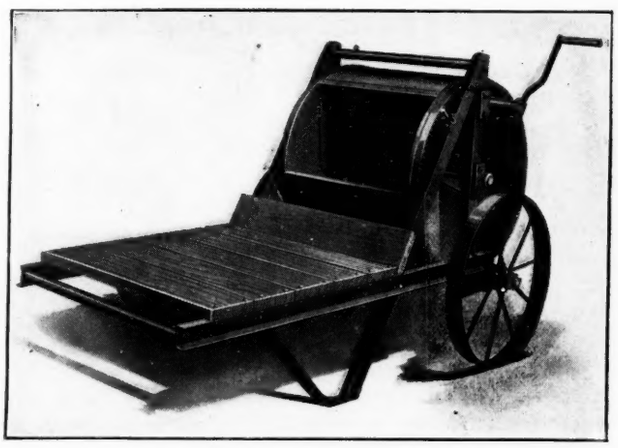
Concreting Underground

The Bunker Hill & Sullivan Mining & Concentrating Co., Stanley A. Easton manager, had about 3100 yd. of concrete to place 2100 ft. below ground and reached by the Kellogg Adit, which is 10,000 ft. long. This work consisted of a concrete lining for the ropeway over a station at the Kellogg shaft.

A job of this kind seemed to justify the purchase of a mixer. In fact, it seemed best to buy one driven by power as there was plenty of compressed air and electricity underground and there would be little difficulty in arranging for connections. But in buying machinery, it is always a mistake to look too closely at the job on hand, even though it may be the biggest to be attempted for a long time. In this case the power mixer would, however, be suitable for work in many places, for electricity and compressed air were available throughout the mine.

Portability of Power Mixers and Mixing Boards

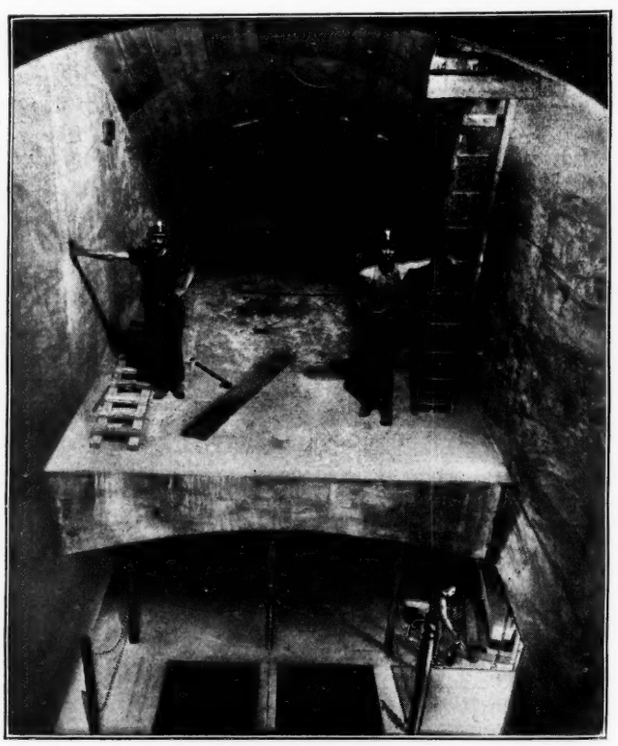
But a power mixer cannot be so easily moved about as a portable hand mixer, which, owing to its lightness, is available in steep as well as in flat places and where there are no roads as well as where the roads are good. The



Smith Portable Concrete Mixer

problem of how to get the power mixer into place would usually be a bigger matter for the mining force to solve than the concreting itself whenever a small job had to be performed.

Nor was it reasonable in the Kellogg Adit to plan to do without a mixer, because the work to be done was too large to be handled in that primitive manner. Besides it is hard to perform any kind of a concreting job in the mine by hand. The mixing board has to be made much too small for effective mixing. If used discontinuously it is likely to be always leaking, and even when constantly in service the continued strains of transportation have an equally bad effect on it. Moreover, a mixing board is not a readily portable piece of apparatus. In fact, hardly anything is more ungainly in a narrow and low place, and a mixer of a light pattern like that sold by the T. L. Smith Co., of Milwaukee, Wis., to the B. H. & S. M. & C. Co. is really



Concrete Work in an Idaho Mine

more portable than the outfit that would have to be hauled around the mine if the mixing was to be done by hand.

It is not necessary to emphasize the fact that machine mixing is more thorough than hand work whenever the work is not inspected, as must always be the case in the smaller jobs around the mine. There is no likelihood when a mixer is used that the work will be neglected because of its laboriousness.

Hand Mixer Available in Narrow Places

It was by reason of these advantages that the Smith mixer was purchased, and it mixed the concrete thoroughly and—what was more important in the cramped quarters available—it took up but little space and so made rapid work possible. For portability is not the only virtue needed in a machine when workmen have to perform their labors in narrow passageways. It is equally important to arrange matters so that it is possible to pass around the machine with the utmost facility.

The concrete work done by this Smith machine has stood for two years and has shown no sign of cracking or scaling, and the mixer is doing scattered jobs around the mines and is making money for the company. Had it been a power mixer it would probably have been idle from the time the big job was completed.

Electric Safety Lamps in Rescue Work

The success in the rescue work at the Mulga mines near Birmingham, Ala., on Oct. 5 of last year, was largely due to the opportune presence of electric safety lamps, which had been only temporarily installed in the mine by the Hirsch Electric Mine Lamp Co. for demonstration purposes. When the explosion occurred it extinguished the open lights and left the men to drift around helplessly in

Superintendent, Foreman and Rescue Squad at Mulga Mine

the dark. One old colored man in a heading just inby from the explosion was wearing an electric lamp, one of the eight installed for a demonstration of their value. He was able because he had an electric light to lead out the men in his entry, and also was successful in reaching the seat of the explosion and in bringing out four more men that could not have lived much longer in such air as they were breathing.

The treatment of the lamps during the course of the rescue work, which lasted 60 hr., was not all that could be desired. They were used so as to get the best possible service for the time being rather than with any regard for their future use. Some were used continuously for 16 hr. without recharging, yet only one gave any trouble, and this apparently was tampered with.

Ira C. Dalrymple says that to the use of these lamps he attributes the speedy recovery from the mine of the dead and living persons. The rescuers, he says, were enabled by the lamps' aid to penetrate all portions of the disturbed area of the mine. There were about 300 men working at the time, and all but 17 escaped.

It is impossible to tell how many men lose their lives in an explosion from an inability to find their way out quickly owing to the extinguishment of their lamps. It must add much to the condition of panic and prevent the use of due judgment at a time when such judgment is most imperative. Provided the air contains sufficient oxygen, the lights can usually be reignited. Sometimes, however, the air is so foul that this is impossible; and in some cases this relighting is not safe, for the explosion may have disturbed several brattices, and the gas which collects may be the cause of another explosion. The electric safety lamp stays lit regardless of the pulsation of the air, and it cannot ignite gas even when the air is charged to the most effectual explosive percentage.

A Case of Inventive Ability

By William Crooks*

In the mining industry, as in all other branches of industrial activity, the man who possesses inventive power and energy is the one who succeeds.

I have in mind several successful mining men who have outdistanced their fellow-workmen and whose success came as a result of exercising originality in their daily work. One of these men, with whom I am personally acquainted and who is a mine superintendent, is forever trying out new schemes. Here are a few of his ideas that are now in practical use: The mine he has charge of has a shaft for hoisting purposes. The men enter the mine by means of a slope, sunk at an angle of 30 deg., through which most of the air enters the mine. The surface arrangements were so constructed that a large steam line passes near the mouth of the slope. This steam line is incased in a concrete culvert, the top of which is level with the surface.

This superintendent conceived the idea of connecting the steam culvert with the intake of the slope. He rightly assumed that he could utilize the radiation of heat in the culvert and increase the temperature of the air entering the mine. This he accomplished, and I am informed that a relative humidity of 94 is now obtained.

Another Practical Suggestion

Here is another of his ideas which increases the efficiency of haulage: Near the shaft bottom, there were several switches operated by trapper boys. He reasoned that the more men or boys there were on haulages the greater was the liability for accidents. To overcome this, he had an old scrapped hand-pump connected to the switch. The pump was operated by water pressure from the main discharge. With this pressure, he successfully operated the switch. Of course, this was crude, but since then he has had special cylinders made which operate from a

*Ensley, Ala.

point 25 ft. distant from the points of the switch, this being done by the motormen as they pass with their trips. Not only did this novel contrivance reduce the cost of coal, but from a viewpoint of "safety first" it was a desirable improvement, since it removed the boys from the haulageways. With these and similar ideas he has embodied in his work it is needless to say that he is a very successful mine superintendent.

One of the secrets—the main secret—of my friend's success is that he keeps in touch with his surroundings. He believes that the mine itself is the best teacher of mining science, and he spends more than half his time in this great school. However, we should not neglect our reading in favor of ten hours per day in the mine, for our view on mining subjects may become very limited should we fail to keep in touch with what is going on in the mining world. There is no royal road to learning, and he who would win success must read, study and observe, to see where improvement can be made, and never let up until something has materialized.

Do not think that because you happen to have a first-class certificate in mining you know it all. The man who can evolve and invent is welcome anywhere, but the fellow who cannot originate and who cannot do anything for the interest of human progress requires a certificate before anyone will listen to his chatter.

Bit Sharpening

In early practice the power hammer might have been defined as a contrivance by which a heavier blow could be struck than a man could deliver with a sledge. No one seemed to realize that a handy little power hammer would cut out the need for the striker, would deliver more blows per minute and place them with more precision, and that the greater weight of the hammer was only one of its advantages. As has usually been the case with new inventions, ingenuity was devoted to the task of getting out larger and larger hammers with heavier bedplates and with cranes for handling large work, and the need and availability of machine hammers for the lightest work in the smallest shop were too often overlooked.

Speedy Work Eliminates Reheating of Steel

But there is no reason why a hammer run by machinery should not be made at a reasonable figure and be as much an adjunct of a small repair shop as is the drill press. There is a great advantage in speedy work, for the quicker the work is completed the less need is there for frequent reheating of the piece being forged. The speedy hammering not only accelerates the work but eliminates much of it and saves the steel from deterioration.

It was with this in mind that the Mayer Bros. Co. started the manufacture of power hammers in the town of Mankato, Blue Earth County, Minnesota. This village would still be unknown to the mining people of the United States, despite its 11,000 inhabitants, had it not been for its manufacture of hammers which have had a large and general sale wherever mining machines are used.

Description of Mechanism

The hammer is driven by a friction pulley having an adjustable boxing. This is placed on the same shaft as a heavy crank disk to which a pitman is attached, the rapid vertical movements of which provide the reciprocating motion of the hammer.

But if the hammer blows were taken up directly by the crank and shafting the result would be disastrous. In the Bradley hammer this strain was absorbed by a heavy spring of the carriage-spring type but almost semicircular in form. The Dienelt & Eisenhardt hammer, made in Philadelphia, had a similar attachment. In the Mayer Little Giant Power Hammer the blow is cushioned by a spiral spring, thus securing a like result.

The downward movement of the pitman causes the lower ends of two arms to approach each other, for these lower ends are attached to rods connecting to a wristpin which is raised when the hammer strikes the block. This approach is opposed by the spiral spring mentioned. Thus, without much motion the force of the blow is cushioned.

Every portion of the mechanism subject to wear is adjustable, and all the parts are of the best material. The foot treadle that causes the clutch on the friction pulley to operate passes entirely round the base of the anvil block and can be put in operation by the toe of the blacksmith while his heel rests on the floor. As soon as he releases the pressure of his foot on the ring, a spiral spring lifts the treadle and so releases the clutch on the friction pulley, thus shutting off the power.

Speed of Operation

The hammer is made in three sizes, 25, 50 and 100 lb., requiring motors of 1½, 2 and 3 hp. respectively. The rapidity with which the machine will rain blows on a piece of steel stock may be easily comprehended from a recital of the number of revolutions per minute, each complete revolution involving a blow on the anvil. The small-sized hammer makes 400 r.p.m. and the others 325 and 250 respectively. Consequently, it is not surprising that the company asserts that 2000 chisel-point bits can be turned out in a day or that 2500 old bits can be repointed in the same time. This is claimed in connection with the special bit die for the manufacturing of pick points for mining machines, which has been designed for use with the 50-lb. hammer.

The Monon Coal Co. of Cass, Ind., has no less than four of these power hammers and the Shawmut interests in Pennsylvania have an equal number at their coal mines.

Another Definition of Success

By Carl Scholz*

The definition of success is about as uncertain as our conception of electricity. Mathematically expressed, success is the result of ambition multiplied by degrees, which vary with the different individuals. What may appear as complete success to one may be regarded as utter failure by the other. By the poor, the rich are usually considered successful, and to the worker of the rank and file the higher officials and managers may appear symbols of success; and yet these parties may have aims and ambitions of a very different character and are totally dissatisfied with their accomplishments. In the strict sense of the word, success has been attained by those who have the feeling that they are doing their work to the best of their

*President, Coal Valley Mining Co. and the Rock Island Coal Mining Co., also vice-president, Consolidated Indiana Coal Co., Chicago, Ill.

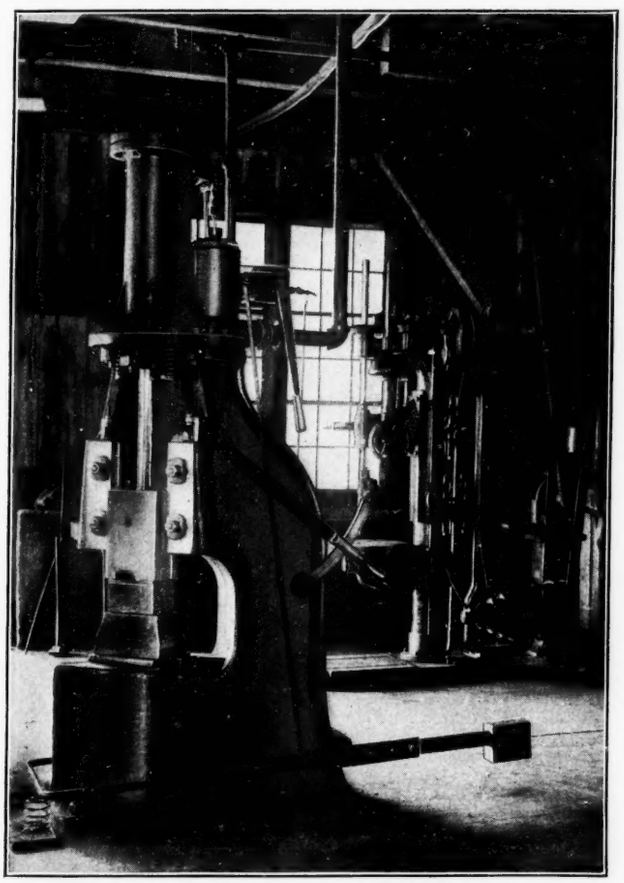
ability, striving always to do better, and are fair to the interests of their employees and employers, as the case may be.

Ambition to advance and progress is the foundation of civilization, and to it is due the progress of this age. It is fortunate, however, that not all of us aim for success in the same direction, and many consider themselves successful without having attained riches or powerful positions.

In a practical way ambition usually receives its reward without this reward being the main aim in life. Men who apply themselves to their work in the proper spirit are usually advanced over those who are diffident. The two principal characteristics that always serve to procure advancement, and at the same time secure happiness and peace of mind, are loyalty and integrity; and employers value these two qualities more than anything else in their subordinates.

A Quick Repair

For those whose mines are not located handily to an adequate machine shop some form of steam hammer is an essential. The uncertainties—or should it not rather



A Bell Hammer at Hammond Colliery of P. & R. Coal & Iron Co.

be the certainties—of inadequate service demand work on the spot. For if the repair job cannot be completed "between trains" there is a possibility that it may have to wait over for another day, and in some cases during the winter months the delay may be even more considerable, for exit and ingress are alike blocked for days.

A repair successfully accomplished was made, however, where the advantages are not so evident because the breakage occurred at a mine in the anthracite region where there are machine shops a-plenty. A piston-rod of a three-stage Norwalk high-pressure air compressor broke at the key connection to the crosshead. Onto this rod, turned to a diameter of $2\frac{1}{16}$ in., the blacksmith at the colliery with the aid of a Bell steam hammer welded a new end. There was a modern 16-in. lathe at the same mine, and so the rod was turned and finished in a couple of hours. It was placed in the compressor and is running satisfactorily.

Those who know what a delay is caused by an accident of this kind will realize how great an assistance is such a speedy means of repair. The breakage occurred at the Hammond mine of the Philadelphia & Reading Coal & Iron Co., which has ten 300-lb. steel-frame Bell combined steam hammers at its various collieries. These are used for welding pieces of circular section up to $2\frac{1}{2}$ and 3 in. in diameter and those of rectangular section up to $\frac{7}{8}$x$3\frac{1}{2}$ in. They also straighten axles $2\frac{1}{2}$ in. to 3 in. in diameter.

The Bell hammer was originally designed for making the wrought-iron forgings to be used in the first coal-burning steamboat on the Great Lakes. It has been in active use and under continuous development for 50 years and so has proved its merits. The Oliver Iron Mining Co., for instance, has nine of these hammers of various sizes at its many operations. The Bell hammer is made by the Buffalo Foundry & Machine Co., of Buffalo, N. Y.

Nobody could make a success out of filling bottles with booze if nobody would empty those bottles.

The Labor Situation

SYNOPSIS—The Elk Coal Co., of Columbus, Ohio, has brought suit against its miners for violation of contract, and the miners have sued the company. The year-long strike in eastern Ohio continues. The Rockefeller Foundation has agreed to give relief to destitute miners in Colorado to the extent of $100,000. The act relating to miners in Alabama and the Workmen's Compensation Bill in Pennsylvania are discussed.

The Elk Coal Co., of Columbus, Ohio, which operates a mine in the Crooksville district near Roseville, Muskingum County, Ohio, has brought suit against its 154 miners individually to collect damages to the sum of $25,000 for the alleged failure of their employees to carry out the wage agreement made Apr. 1, 1914.

On Mar. 17 three men were discharged by the mine boss for insubordination. Thereupon all the miners stopped work and demanded the reinstatement of the discharged employees. The company refused to allow them to work, and the officials of the United Mine Workers of America in Ohio were notified. These state officials ordered the strikers to return to work, and the Roseville local charter was revoked. By a vote of 67 to 28 the Roseville local asked for the renewal of their charter, but the state officials require that their demands be granted before the charter is returned.

In its suit the Elk Coal Co. called attention to a clause in the wage agreement providing that all disputes are to be referred to the district mine officials for arbitration. This part of the agreement was violated; hence the filing of the suit.

Miners Endeavor to Offset Action of Elk Coal Co.

John Moore, president of the Elk Coal Co., is authority for the statement that about a dozen of the miners, practically all of whom are Americans, have transferred their properties to their families.

As no settlement had been made by the evening of Mar. 27 between the striking miners and the company, 50 of the employees filed suit against the Elk Coal Co. for their unpaid wages. It is expected that 90 others will file their claims. The coal company was holding back about $4000 due in wages to pay the expected judgment of $25,000.

Apparently there is some hope of a settlement in the Coshocton field. The operators and the union arrived at a settlement some months ago, but the miners were obdurate when the matter was submitted to a referendum. As the operators are willing to pay more than 47c., there is no reason for the delay in settlement. The district is small, having only about 1000 miners.

The eastern Ohio strike situation is unchanged. Only small operations are working in the eastern Ohio and Coshocton districts. There is no chance of a settlement in the former district, though the strike has now lasted a year. President Wilson seems to be waiting for the passage or rejection of the Gallagher amendment to the Green Antiscreen Bill before taking action.

Nick Mausreck, a striking miner of East Liverpool, was shot recently while he and two other strikers were trying to persuade nonunion men to quit work at the small mine of the Island Run Coal Co.

Rockefeller Foundation in Colorado

The Rockefeller Foundation, through its president, John D. Rockefeller, Jr., has consented to assist the State Committee on Unemployment and Relief in Colorado to the amount of $100,000 if necessary, during the next three months. It is hoped that by that time work may be found for the unemployed on farms and in mines or elsewhere. W. L. Mackenzie King is the director of the Industrial Relations Department of the foundation.

Seeing that many of these men who are thus cast on the generosity of the Rockefeller Foundation are men who since they drifted into Colorado have done nothing but make trouble for Mr. Rockefeller and the corporation in which he is interested, and seeing further that Mr. Rockefeller has not made anything but the most meager returns on his Colorado investment, we cannot but admire the liberality with which he overlooks the past and sees only the need of the men, disregarding their crimes and their folly.

We have heard much of the packed juries in Colorado, but however unfairly they may be selected, they seem to be little disposed to convict the men brought before them. Perhaps the men are not guilty, but someone is, and it is much to be regretted that no one is to suffer for the terrible crimes by which Colorado has been disgraced. The citizens of that state should make every endeavor to see that none escape.

Child Labor in Alabama

A law was approved on Feb. 24 in Alabama requiring that "no child under the age of 16 years shall be employed, permitted or suffered to work in any capacity in, about or in connection with any mine, coal breaker, coke oven or quarry." The act provides that after Sept. 1 of this year no child under 13 years old, and after the same date next year no child under 14 years, shall be employed in any gainful occupation, except agriculture or domestic service. Children under 16 years must not be employed at any hazardous occupation, and employment certificates are required before they can engage in such work, except in connection with agriculture or domestic service.

Compensation in Pennsylvania

The joint House Judiciary General Committee and the Senate Corporations Committee of the State of Pennsylvania have been giving hearings on the Brumbaugh Workmen's Compensation Law. The principal objections were to the exemption of farm labor and domestic servants, the granting of compensation to aliens in larger sums than they would get in their own countries, the judgment liens, the removal of the common-law defense for corporations and the state insurance features, which mutual- and stock-insurance heads claim remove competition.

The exclusion of farm laborers and domestic servants is merely a means of conciliating a large vote. The employees of a farmer or of a householder need compensation just as much as a man who works for a corporation. The miners want the compensation raised to 66⅔ per cent. of the wage. Van Bittner, of Pittsburgh, and Frances Feehan, of Hazleton, spoke in favor of this percentage.

Edgar W. Tate, of the Pittsburgh, Shawmut & Northern R.R. and the Shawmut coal interests, said that a death after 300 weeks should not be compensable, as the cause of death would be hard to determine and might not be due to the accident causing disability. He desired the time reduced to 100 weeks.

The Secret of Success*

By Thomas Dreier

The secret of success is not a secret. Nor is it something new. Nor is it something hard to secure. To become more successful, become more efficient. Do the little things better. So work that you will require less supervision. The least supervision is needed by the person who makes the fewest mistakes. Do what you can do and what you should do for the institution for which you are working and do it in the right way, and the size of your income will take care of itself.

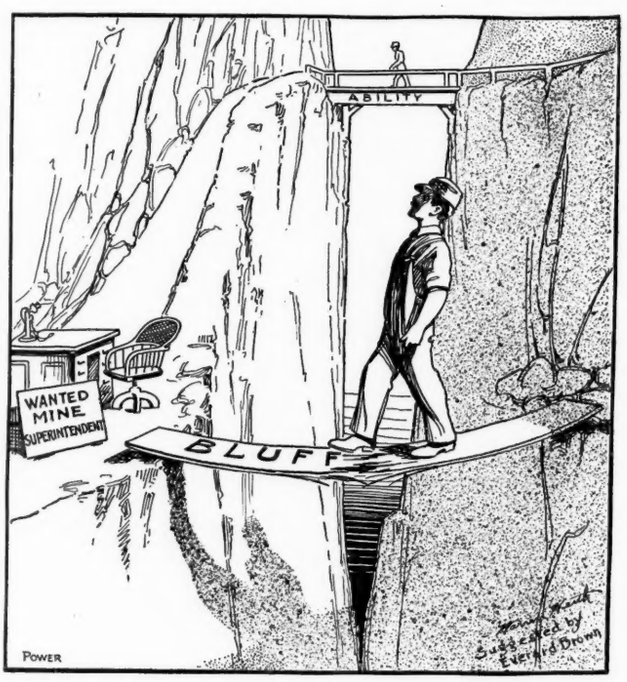
Let your aim ever be to better the work you are doing. But remember always that you cannot better the work you are doing *without bettering yourself*. The thoughts that you think, the words that you speak and the deeds you perform are making you either better or worse.

You can be what you will to be. Forget yourself in rendering service to others. If an employee, strive to make yourself of greater value to your employer. Look upon yourself as a manufacturer. Think of yourself as being in business for yourself. Regard yourself as a maker and seller of service, and ever bend your thought and your energies toward *the improvement of your product.*

The wise manufacturer never injures his machinery willfully. Your body, your mind, your soul serve as your plant. Eat and drink only that which will nourish your body; entertain only thoughts that will enrich your mind.

The world is hungry for quality service. It wants to pay for it. It is paying for all it can get. The market is not crowded. There is a chance for you right now. There is a chance for you right where you are. The time to start is now.

*This article was submitted for our Success Number by J. G. Puterbaugh, president of the McAlester Fuel Co., McAlester, Okla.



The Longest Way Around Is Often the Shortest Way Home

Editorials

The Mining Engineer and Publicity

The mining engineer has certainly failed completely to place himself before the public in the right light. We hear about the "wonderful" advances in bridgework and railroading. Even in our schoolbooks we read about the ingenuity of the inventors of the cotton gin, the harvester and the sewing machine. The pictures of these men and machines are associated with our earliest recollections. In fact there was a time when we were divided between a desire to duplicate these inventions and a longing to be a cowboy and kill Indians, so fervent was our hero worship for these pilots of industry.

But the public has no such thoughts about the mining engineer. Only his mistakes have refused to stay buried. His triumphs have failed to impress themselves on the public. The only epithet the average man deems fitting in connection with the mines is "awful." He has used that word so much that usually it has no meaning, but when he says those "awe-full mines" he breaks the word up with a hyphen and seems to be dwelling on its significant derivatives.

He does not admire the system with which mines are worked. He does not pay tribute to the marvelous successes of the mining-machine makers who have discovered a means of cutting coal like cheese. He overlooks the fact that the coal operator gets out the coal for a fifth or tenth part of the money which is actually paid for its delivery to the cellar. He does not marvel at the system of ventilation which delivers a steady breeze through miles of airways. There is no interest for him in the fact that the water pumped from our mines is in places ten times as heavy as the coal extracted.

The wonders of the mines have been overlooked, partly because the mines are far from the big cities, and partly because the mining engineer has not sought the requisite publicity, and partly also because we are no longer an appreciative people.

When institutes meet, the local spellbinders rise and tell the guests at the banquet table how important is the mining industry. All they know about the mines is the total tonnage produced and the number of men employed. Their rhapsodies fall entirely flat because no one has really acquainted these orators or the public with what constitutes the real wonder of mining—its ingenuity and its problems.

Recently a doctor was overheard to say that engineering was an easy subject to master, because once learned no more study was needed. The professional stock-in-trade required no replenishment. It was not like medicine, where new discoveries were being made every day.

It is needless to point out that mining is progressing as fast if not faster than medicine. And the retort discourteous, which we also overheard, was also true. It was that medicine was largely expending its energy in chasing its own tail and frequently heralded its revivals of old principles as if they were new inventions.

The trouble with the mining profession is that it lacks advertising. It should have its right place in the public prints. The articles read at the institutes should be carefully briefed for the public consumption and should be given a proper place in the press. Space for politics is conceded by the yard; space for mining and engineering—even in such mining and manufacturing centers as Pittsburgh—is granted grudgingly by the inch.

That is not the condition of things in England. The British Association for the Advancement of Science, when in session, receives in the better class of papers page after page of copy. Scientific lectures are reproduced in the newspapers, briefed it is true, but at what would here be regarded as being at great length.

Once accustom the public to consume such matter, and without question it will soon be in demand. It is the duty of the mining engineer to his profession and to his industry to give the public to understand what marvelous advances are being made by both.

Canada Desires a Higher Coal Tariff

The competition of foreign coal and fuel oil with local coal has led to efforts being made to induce the Dominion of Canada to protect the coal-mining industry of the western provinces. This desire for protection has probably been accentuated by the depression in business and the impoverishment in Vancouver Island following a long strike. It is also, perhaps, fed by the "Made in Canada" movement which has been fostered so naturally as a response to our own "Made in America" campaign.

This subject was brought before the convention of District 18, United Mine Workers of America, when delegates from the coal-mining districts of Alberta and southeastern British Columbia met at Lethbridge, Alta., about the middle of February. A press dispatch from Lethbridge, dated Feb. 19, stated: "To relieve the abnormal distress prevailing in mining camps the miners will take steps to forcibly impress on the federal and provincial governments the need for adequate relief. At the miners' convention a resolution was submitted urging that a tax be placed on all coal coming in from the United States. It was said that much of the distress was due to the fact that 50 per cent. of the coal used in Alberta and Saskatchewan was admitted to Canada free of duty, that the production of a similar quantity in the district would give employment to 3000 men and at the same time afford the government a revenue from the royalty paid on the increased quantity of coal which would be mined in the district."

About the same time a deputation from the coal-mining districts of Vancouver Island and of Nicola Valley on the mainland of British Columbia waited on the provincial government at Victoria and urged that it endeavor to induce the federal government to impose a customs duty of one cent a gallon on coal oil now admitted into Canada duty free. It was represented that last year there was

brought into British Columbia a quantity of fuel oil equivalent to 700,000 tons of coal. Five years ago, it was stated, only 5,000,000 gal. of fuel oil was brought into British Columbia annually from California, but the trade has since grown enormously so that in 1914 the quantity thus imported was not less than 110,000,000 gal. The oil trade was said to be booming while the coal trade is languishing, with several thousands of coal miners working only half-time or less.

On the other hand, an influential deputation, representing some of the larger users of oil, made strong objections before the provincial government, opposing any such action as the coal-mining interests desired. Representatives of railway and steamship companies using much fuel oil and of a local oil-refining company urged that large investments had been made in railway and steamship equipment and plant for the storage and burning of oil and that the cost of substituting coal-burning for oil-burning equipment could not be borne. This deputation, as also that representing the coal-mining industry, was asked to put its case in writing and the provincial government would forward both to the federal authorities at Ottawa.

Western members of the Dominion House of Commons, now in session at Ottawa, have been asked by many of their constituents, through local boards of trade, to do everything possible to secure the imposition of a duty on fuel oil, for the reason, as urged from Nanaimo, that "conditions are not improving and the community's prosperity depends upon the protection of coal against duty-free oil." The representative of Nanaimo in the House of Commons has written in reply:

> We are taking up this matter with the Prime Minister, but I would warn you not to be too optimistic as to the result, for the following reasons: There is a war tax of 7½ per cent. ad valorem placed on crude petroleum, also on the finished product, that is, on the finer oils. There is also an import duty of similar amount placed on bituminous coal. Both these taxes are in favor of the coal-mining industry, especially of the Vancouver Island field. Of course they are essentially war taxes, and will be removed when they have served the purpose for which they were intended. This would leave the coal-mining industry without any protection whatever. We intend suggesting to the Prime Minister the advisability of appointing a small but efficient commission to advise the government as to the best means of encouraging and protecting the coal-mining industry.

The Consumption of Coal by Miners

In 1913 the mines of the United States sold to the local trade and their employees—principally the latter—15,871,535 tons, or an amount equal to 2.9 per cent. of the coal shipped and converted into coke. Had the miners of the United States produced only the same amount of coal per man per year as those in Great Britain, the tonnage consumed in local trade and for the use of employees would have been 44,282,000 tons. Thus 28,410,000 tons would have been wasted. The tonnage of coal used for local purposes would have been equal to 8.3 per cent. of the aggregate tonnage shipped and coked instead of 2.9 per cent., which, as has been said, was the proportion actually used.

The saving thus made of nearly 30,000,000 tons every year is a considerable conservation, arising partly from methods which are not conservational but which seek mainly a large production per man engaged. It must not be forgotten therefore that, in order to save coal, much coal, as well as much labor, is often wasted. The question for the conservationists is, How can we save coal without a loss greater than the value of the mineral conserved?

Were the miners of the United States everywhere to produce as much as they do in the Pennsylvania bituminous mines the showing in favor of this country's methods would be even better. In Pennsylvania an amount equivalent to 2.5 per cent. of the tonnage shipped and converted into coke was consumed by local trade and for the use of employees. Yet had the employees of Pennsylvania produced only as much as those in Great Britain the equivalent of 9.2 per cent. would have been expended in heating the homes of the employees and in local trade.

In fact, the small percentage of tonnage used locally in Pennsylvania bituminous regions probably arises chiefly from the large output of each man employed, for a miner who mines 3.78 tons per day in Pennsylvania will probably use no more and no less coal directly or indirectly than the man who mines 1.98 tons per day in Michigan.

Just to what extent the local trade in coal consists of trade not directly maintained for the benefit of the mines would be hard to assert. But it is certain that, on the other hand, much coal which is shipped is employed to manufacture what the miner needs. So that, all things considered, the figures labeled "for local trade and miner's use" really represent a sum not very different from that part of the tonnage which is actually used for purposes incidental to mining, excluding that used at the mines for steam and heat.

Some day, it is to be hoped, we shall adopt methods of conservation in which labor, surface conditions and material will all be conserved. It appears that it will soon be possible, by a form of mining slightly different from any now in operation, to make such a perfect consummation of economy. Our present room-and-pillar methods are as badly out of date as the methods of home industry customary in the Middle Ages. Some day we will see a mine run as intensively as a factory, the actual digging operations in which will be spread over an area scarcely larger than that occupied by a big machine shop.

Meantime we can congratulate ourselves that we have a lower loss of life per million tons produced than Germany, France or Japan and a larger output per man employed than any country in the world, while the future gives bright promise that we may yet capture other records. Meanwhile let the conservationists continue their good work, for it is not likely that we shall succeed in saving coal unless we are continually urged to handle it as a patrimony owned equally by our children.

Our readers will be pleased to be apprised of the following incident which occurred after the Layland explosion. Frederick T. Haskin, a writer for the Pittsburgh *Gazette-Times,* relating the story of the rescue work, says among other matters scarcely less apocryphal: "Staggering toward them were five men, pale as death through their grime, and barely able to walk. One of them had his head wrapped in an improvised helmet made of brattice cloth, so that his nose was covered, while he fanned air into his mouth with the aid of a tin bucket."

Apparently he thought that afterdamp has a peculiarly severe effect on the nose but could be breathed through the mouth with impunity. Or is this one of the many instances in which a newspaper writer has supplemented fact by drawing on a generous imagination?

Discussion By Readers

Success in Educating the Foreigner

The recent discussion on "The Foreigner in Mining" interested me greatly, and I want to relate some of my experience in educating this class of mine-workers. Before doing so, however, I will say that the foreigners, or the great majority of them at least, are not capable of making much headway by themselves. As a class, they require much pushing.

The majority of the foreigners employed in these mines enjoy sitting around the coke ovens, in the evening, after the day's work is done, and recounting the happenings of the day or recalling incidents past and present. Such was the general condition of this class when I first came to the coking plant. I approached several of these men and found a ready response to my inquiries. They said that they would gladly attend a night school if they had a teacher. I offered my services and promised that if more was required than what the superintendent of the plant and I could give them, we would arrange to have a teacher come over from the adjoining township.

The following evening a meeting was held in the little schoolhouse, and five men were present. Everything was arranged that evening for the opening of the night school at once. This was done, the first session of the school being held the next evening. The work began with the study of reading, writing and arithmetic. At the end of a month there were 14 scholars in attendance. Some of these could not read or write, and a few did not know A from B, but they all persevered in their work. The first term lasted six months and at its close each man could read and write and some were so far advanced as to be able to figure in decimals.

It may readily be imagined that it took lots of grit and perseverance to keep this class together and to make it interesting to all. Occasionally the men would stay away by turns, but whenever this happened I would hunt them up and ask them the reason for their absence. Often the reply was, "I can't learn," or "I hate to trouble you so much," or "I am so tired in the evening that I do not feel like studying." Still we persevered. The class was held twice a week, the session opening at 7 o'clock in the evening. Often we would not leave the school until 10 or 10:30 o'clock.

The class has been in session for three months, this term; and we have a few more advantages than we enjoyed last year, owing to the superintendent's taking up the matter with the company. Being a progressive man himself, he succeeded in interesting the company in the men's welfare. As a result the officials gave us the use of one of the company's houses and had it fixed up for a school, including also a "First-Aid room." The men were free to meet in this place every evening, if they desired, and those who wished enjoyed the privilege of smoking.

At the present time many of the men are well advanced in the common rudiments and have commenced the study of mining, including mining laws. Monday night is "First-Aid night." There are 20 men in the First-Aid class, and the mine foreman is the instructor. Indirectly, the sessions of the school are a great benefit in keeping the men occupied and drawing them away from the saloons. I often mention in my talks the evils of gambling and drinking, and this has a good effect.

The work of the school keeps me busy in my spare time, looking over the work of the previous night or preparing questions for the following evening. However, no one but those engaged in the work knows the satisfaction that comes from seeing the improvement of men who were once illiterate, but are now able to read and write. This satisfaction certainly pays well for all the energy expended in keeping the men interested and at work. I can say that the experience gained has been a personal benefit to myself. I am convinced that if more mine officials would interest themselves in the same way for the welfare of their men there would be less booze consumed and less crime committed. The work will produce better men and more skillful workmen in the next generation, if not in this. Its tendency is to make law-abiding citizens.

JOHN T. BRADLEY,
Mine Foreman, Elm Grove Works.

Dunbar, Penn.

Recognition of Bravery

Letter No. 8—I have been much impressed with the letters that have already been written on this subject and was particularly pleased to note the attitude taken by COAL AGE in response to the same, as appears at the bottom of p. 383, COAL AGE, Feb. 27.

As stated in "Bykem's" Letter No. 1, "Deeds of heroism in and about a mine are, as a rule, given little consideration and quickly forgotten, because it is generally assumed that such acts are a part of a miner's calling, and he is expected to face all dangers without a thought for his own personal safety."

I heartily concur in this judgment of public opinion. Wherever or whenever there is an explosion, or other disaster in a mine, the miner is ever on hand and ready to face any danger, none being too great for him, in an effort to rescue fellow workmen. What is his reward for such heroic sacrifice? The record of the disaster published in the county paper or possibly the daily local may contain a mention of his brave act; but rarely does his name appear in the official report of the disaster, and the fact is soon forgotten that others than members of the regular rescue corps rushed to the scene have taken part. Too often it happens that the names and deeds of the trained official rescuers are emblazoned on the record as being *the ones* to whom all credit is due. The humble miner, whose courage, bravery and prompt action made possible the later work of the regular rescuers, is practically lost to view in the glamor of the occasion. And yet he it was, in many cases, who ably assisted in the actual performance of the work done on the arrival of the official rescuers.

Bykem asks, "Would it be better to bring all worthy acts under one general classification?" and "Should the award be entirely honorary in all cases?" It seems to me better that any award for bravery should be wholly honorary and without partiality. In my opinion there should be an honor roll on which should be placed the names of all mine workers whose brave acts are worthy of mention. It is not that such recognition is necessary to arouse the miner to action; nor that the miner desires that his act should be especially mentioned; but this very fact that he asks nothing is all the more reason why his acts should be recognized in a suitable manner.

No true miner holds back from the work of rescue, in time of peril, fearing that he will not receive due credit for his act or be suitably rewarded for the sacrifice he makes. His first thought is the peril of his fellow workman, and he is actuated by his desire and hope that he can rescue the one in danger. He looks for no reward—he asks for none. For this reason he should be given a generous recognition in a way that will show clearly that his act is appreciated. I hope that this question will appeal to many and that we shall have the benefit of their views. By this means, the broadest and most helpful measures will be developed.

JOHN NEAL.

Dayton, Tenn.

[As an illustration of the fact mentioned in the above letter that the description of many mine disasters and the record of brave acts performed by local men and published in the local papers rarely find a wider publicity, we have abstracted the following from a report of the Belle Valley mine explosion on May 20, 1913, as taken from the *Jeffersonian,* a local paper of Cambridge, Ohio The record speaks for itself. It is, in substance, as follows:

That there were not more lives lost in the Imperial mine disaster of Saturday night last is due to the cool head of J. B. Morris, superintendent of the Caldwell mine, at Caldwell, who with his able assistants, Harry Rowland, John Smalley and M. S. Moore, was the first to enter the mine and do any effective work following the explosion.

Superintendent Morris is one of the most experienced coal-mining men in this part of the state. He is a quiet, unassuming man, having little to say of his own acts. Mr. Morris was at his home in Caldwell on the fateful Saturday evening when notified of the disaster in the Imperial mine at Belle Valley and asked if he would take charge of a rescue party. He replied that he would if he could get an automobile. Almost before he could equip himself for the journey, two automobiles were at his door and a flying trip was made to the mine.

Arriving on the scene, Mr. Morris learned that a few brave rescuers, under the lead of Henry Fairhurst, were already in the mine attempting a rescue. Having carefully selected a few experienced men from among the many who offered their services, Mr. Morris hurried below with his party. Finding a doctor at the bottom of the shaft, waiting for those in the mine to bring out a man with a broken leg, Mr. Morris sent the physician to the top of the shaft, telling him to wait there for the man, who would be sent up as soon as brought out.

Proceeding then as rapidly as possible along the entry, while making necessary repairs by closing open crosscuts with canvas, the party first picked up J. R. Yeager and sent him to the shaft bottom, badly hurt. Mr. Fairhurst was then found overcome with the afterdamp, and all the remaining members of the first party were more or less affected by the gas and had to be removed, they having advanced too rapidly ahead of the air. Having sent all these men out of the mine, the party in charge of Mr. Morris continued the investigation of the mine for three hours before returning to the top of the shaft. All this was done before the arrival of the special train bringing Superintendent Mathews and Deputy Mine Inspector Elwood, together with some Cambridge surgeons.

The above account taken from a local paper, we believe, found no publicity in any official record and illustrates the point to which correspondent refers and which is certainly worthy of attention.—EDITOR.]

Directors' Visits

In the "Extracts from a Superintendent's Diary" on p. 507 of COAL AGE for Mar. 20, 1915, is incidentally revealed what I believe is one of the greatest idiocies of the ordinary board of directors:

For two years now we have been looking forward to a visit from our directors, but only today was the great event consummated.

On several occasions during that two-year period word came down the line that we might expect the inspection party in a few weeks, but always before we completed our house cleaning the rumor would be discredited and our improvised whitewash squad would be dismissed. But about two weeks ago positive instructions were issued from our general manager's office to prepare for today's inspection, and the wording of the order made it clear that this time there would be no change of plans.

As a consequence the past two weeks has been a busy time for the floating gangs. All scrap iron has been gathered up and classified, mud holes in our roadways have been filled in, grease and oil spots on engine house floors have been sanded and scrubbed, and two crews with whitewash mixtures have transformed trees, fences and outbuildings into veritable snowdrifts.

I know just the procedure, for the last big plant I worked in had a Boston board of directors that always sent word a week ahead that it was coming to see us, and then there would be the most frantic cleaning up imaginable. If the board had ever gum-shoed down to see us the members would have seen something that would have opened their eyes.

Inasmuch as industrial dirt usually means industrial inefficiency, if a plant were kept reasonably clean all the time, in fear of an unannounced directors' visit, the operating results would probably be better.

Here's hoping that some day there will be more pussyfooted directors whose desire to know the business will outweigh their sense of their own overwhelming importance.

DONALD M. LIDDELL.

Elizabeth, N. J.

Safety Hints

Letter No. 1—I wish to offer a few comments on two of the statements contained in the letter of Mine Inspector Rose, COAL AGE, Feb. 27, p. 385. First, Mr. Rose states as follows:

I am not opposed either to safety committees in mining or to the posting of danger signals in and about coal mines as a precautionary means of impressing the idea of safety on all mine workers. However, I greatly fear that the multiplicity of these signs, giving warning of unsafe places or conditions, may engender in the minds of many mine workers the idea that all unsafe places are properly marked and guarded, and that less care and precaution are needed on their part in protecting themselves in their own working places or where such danger signals do not appear.

I agree with Mr. Rose's suggestions that danger signs may be overworked and, as a result, lose part of their significance and usefulness. Where there is a great multiplicity of such signs it is true that miners may grow careless and indifferent to their meaning; and, in the absence of danger signs in certain places, they may naturally assume that if the place was dangerous it would be so marked.

However, from Mr. Rose's reference to the miners' own working places it would seem that he suggests placing such signs at the working face. I do not believe that the erection of danger signs is justified in working places; nor in the inside entries leading to a few rooms only. In such places covering but a small area, the miners working there may be assumed to know the weak places and to be more familiar with the local conditions existing therein than anyone else. In fact, Mr. Rose later remarks, in respect to the mine foreman not being as well acquainted with the conditions in a working place as the miner who works there continually, shows that he is of the same opinion.

Tracklayers and timbermen whose duties call them to work in many such places have learned to look for danger and they do not expect to see danger signs in such places. In general, it is a safe rule that where but a few men are working they may be expected to be thoroughly acquainted with the conditions of the place and the verbal instructions of the foreman warning them occasionally of the need of caution should be sufficient. Moreover, a verbal warning carries with it the human element, and is often more forcible than a printed sign, which is merely mechanical.

On all main entries, haulways, manways and other frequented places I favor the posting of danger signs in every place where danger lurks. However, it is important to remember that the erection of such danger signs does not fulfill *all* the duties of the mine foreman or the men frequenting such places.

I believe the sign "Safety First" has a good general effect as impressing continually on the minds of all persons the need of necessary precaution in their work; but let the management follow this precept by making the mine reasonably safe. It is incumbent on them to see that all entries are well lighted; the floor free from obstructions; the roof well timbered; refuge holes provided at regular intervals where needed and kept whitewashed and well lighted. Indeed everything should be done to promote safety in the mine. In addition to this, all places that cannot be made absolutely safe should be plainly marked with suitable danger signs to warn any who are not acquainted with their condition.

Again, referring to Mr. Rose's statement, "Train and discipline every mine worker to detect dangerous conditions and to know how to avoid or escape them," I want to say that in spite of the best effort in this direction, on the part of both officials and miners, it is unavoidable that many who are employed and permitted to work in the mine do not possess the necessary knowledge and training that will enable them to detect and avoid danger. Their training is inadequate. In many cases, it is the result of the miner's previous association and experience in mines where he has been employed.

For example, it frequently happens that a young miner when first engaging in the work of mining coal at the face finds that his "buddy" takes all the necessary precautions for safety. As a result, he comes to depend too much on the older man rather than on himself. Again, the more frequent visits of the mine foreman to a new man's place has a tendency to relieve the worker of that sense of personal responsibility which is thus shifted to the foreman's shoulders.

The negligence of the average practical miner as a factor in the inadequate training of the beginner was forcibly impressed on me by the words of an old miner, who remarked, "When I took my boys to the mine with me I always went over the roof, sounding it carefully, while the boys went at once to work. In doing this, I made a mistake. I should have made them do the sounding of the roof. As it was, they learned to depend wholly on me instead of on themselves, in this respect. Now I find when I visit the rooms where they are working for another that they follow too much their old habits of going at once to the coal face and beginning to work as soon as they enter their rooms, without knowing whether the place is safe or not."

GEO. N. LANTZ.

New Straitsville, Ohio.

Mining Laws, Legislation and Mine Regulations

Letter No. 41—I have read with great interest all the letters relating to mining laws and legislation. I consider this discussion a most important one, in which many valuable suggestions have been made. There are, however, two points that I think have been neglected by writers thus far.

Much has been said in regard to the granting of certificates; but I do not remember that the question of requiring a mine superintendent to hold a certificate has been mentioned. I want to ask, Why is a mine foreman required to hold a certificate showing that he is capable of performing the duties of his position, while the mine superintendent, who is his superior, is exempt from such requirement? By what law of reasoning can it be shown that the responsibility for the safe operation of the mine should rest on the mine foreman, who *must* act in accordance with the orders he receives from his superintendent; while the latter is not required by law to pass an examination or to otherwise give evidence that he possesses the same knowledge and is as capable as the foreman who carries out his orders?

The mining laws of Europe are often held up as being examples to follow. If this is true, why should not some of the best features of these laws be incorporated in our own statutes? In England, a mine manager (superintendent) must have a first-grade certificate, while the mine foreman is only required to have a second-grade certificate, in order to hold that position, in any mine.

In England, all mines are considered gaseous; there is no such classification as "gaseous" and "nongaseous." The mine manager (superintendent) there must pass an examination that is about as severe as that required of our mine inspectors. If this is necessary in England where the conditions of labor are much better than in this country I would ask, Why is this matter entirely ignored in the mining laws of Pennsylvania and other states? The condition existing here seems all the more strange when we reflect that the mine foreman can perform the duties of superintendent without any additional examination or certification; but a superintendent cannot perform the duties of a mine foreman until he has passed the examination and taken out a certificate qualifying him for that position.

Another incongruity in our mining laws is in respect to the relative danger due to the presence of gas and lack of sufficient timber. Mine inspectors' reports show that the loss of life due to falls of coal and slate

very largely exceed that caused by gas—the former being 62 per cent. as against only 2 per cent. due to the latter cause. Notwithstanding this fact, mines are classified as dangerous or otherwise, according as they do or do not generate *gas*. It is clear that a mine might be perfectly safe as far as gas is concerned and yet, owing to peculiar conditions in the roof, the same mine might be one of the most dangerous class to work.

The mining law generally requires the mine foreman or his assistant, in *gaseous* mines, to visit every working place before the men are permitted to enter the mine for work. Contrast this condition with the fact that, no matter how dangerous the roof conditions in a mine may be, there is nothing in the mining law that compels the same frequent inspection of the working faces. A miner may enter such a mine and proceed to work in a place not visited by any official, until later in the day if at all. I know mines where gas is not reported more than once in six months; but because they are classed as "gaseous" mines, the mine foreman or his assistant must visit each working place three times a day to comply with the law.

In offering these remarks, it is not my purpose to suggest a less frequent inspection of mine workings generating gas. I desire, instead, to emphasize the need of giving the same close attention to the inspection of mines where the conditions are such as to require a better support of the roof and constant watch and care.

Every practical mining man knows that this feature of the mining law imposes a heavy burden and one that is unwarranted on certain mines that are unfortunate enough to be troubled with an occasional pocket of gas; and must therefore be classified as gaseous mines; whereas it is possible that such a mine may be far less dangerous and require less frequent inspection to provide the same degree of safety than another mine close by that has been able to evade such a classification with all its attending evils, such as, for example, the employment of three or four additional firebosses to make the daily inspection demanded by the law.

I would suggest, in this connection, that there would be less incentive for some mine foremen to omit reporting "gas" when such is found occasionally at the face of a room or heading, if the mining law read somewhat as follows: All places where men shall work or pass shall be examined daily by a duly appointed competent person. Such a provision of the law would make the inspection of mines more general and not discriminate in favor of nongaseous mines that are often equally dangerous with those classed as gaseous.

THOMAS HOGARTH.

Burgettstown, Penn.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

CARBON DIOXIDE

This gas, often called "carbonic acid gas" or "chokedamp" is a colorless and odorless gas, having a distinctly acid taste. It is not combustible and will not support combustion in any ordinary form.

How Produced—Carbon dioxide is the product of the complete combustion of carbon or carbonaceous matter in a plentiful supply of air or oxygen. It is produced, in mines, by the breathing of men and animals; burning of lamps; explosion of powder; slow combustion of fine coal and slack in the gob; and other forms of combustion taking place.

Effect on Flame—Carbon dioxide has a similar effect on flame to that caused by an excess of nitrogen; or, what is the same thing, a depletion of oxygen in the air. The presence of carbon dioxide in the air tends to reduce the activity of combustion. It dims the flame of a lamp and extinguishes it when present in sufficient quantity.

The percentage of carbon dioxide that will extinguish flame depends on both the **nature of the flame** and the **amount of oxygen** in the air feeding the flame. A **gas-fed flame,** as the hydrogen flame of the Clowes lamp, or the acetylene flame of a carbide lamp, is less susceptible to extinction from this cause than is an **oil-fed flame.**

The flame of a lamp burning sperm or cottonseed oil is extinguished in an **artificial atmosphere** (which is the usual condition in a mine) containing 14 per cent. of carbon dioxide. But, in a **residual atmosphere** formed by allowing the lamp to burn till extinguished in a closed place, only 3 per cent. of carbon dioxide is required for extinction of the flame.

Effect on Life—Carbon dioxide is not classed as one of the poisonous mine gases, although it exerts a **toxic effect** on the human system. It is irrespirable when unmixed with air and if breathed produces death by suffocation. In smaller quantities, it causes headache, nausea and pains in the back and limbs.

According to Dr. Haldane, no appreciable effect is produced by breathing air containing carbon dioxide, until there is about 3 per cent. of this gas present. Breathing then becomes slightly more difficult; 5 or 6 per cent. of the gas causes decided **panting;** and 18 per cent. **suffocation and death.** The effect of the gas is much increased if the oxygen content of the air is below the normal.

For example, with 18 per cent. carbon dioxide present, there is 0.209 (100 — 18) = 17.14 per cent. oxygen and 0.791 (100 — 18) = 64.86 per cent. nitrogen, under normal conditions. This is a **fatal atmosphere.**

But, if the oxygen of the air has been depleted so that the ratio oxygen : nitrogen is less than 20.9 : 79.1; then a less percentage of carbon dioxide than that named above (18%) would be **fatal to life.**

Treatment When Overcome—Remove promptly to fresh air; apply alternately cold and lukewarm bandages to the chest; rub the limbs and body briskly to start circulation; and, if necessary, use artificial respiration. When consciousness is restored put the patient to bed and keep him quiet for several days.

The Coal Age Pocket Book

BLACKDAMP

It is a common mistake in mining practice to regard carbon dioxide as another term for "blackdamp," which is found in such quantities in many poorly ventilated mines. The two gases, however, are quite different.

The term **blackdamp** describes a variable mixture of air deficient in oxygen, and carbon dioxide. It consists therefore of carbon dioxide, nitrogen and oxygen, in varying quantities. The percentage of **oxygen** in the mixture will determine its respirable quality. The **nitrogen** is wholly inert and acts only to dilute the mixture and thus reduce the percentage of oxygen present. The **carbon dioxide** not only dilutes the mixture but produces also a toxic effect on the human system, although this effect is not of such a nature as to class carbon dioxide as a poisonous gas.

The **production of blackdamp** in coal mines is due to two chief causes: 1. The absorption of the oxygen of the air by the coal. 2. The generation of carbon dioxide by the various forms of combustion or oxidation continually taking place in the workings of the mine.

The **absorption of oxygen** from the mine air by the freshly exposed surfaces of coal is more rapid than what is generally supposed. Experiment has shown that a certain freshly mined bituminous coal absorbed from one-eighth to one-seventh of its volume of oxygen from the surrounding air, in 24 hr.; while only about one-tenth of this oxygen was converted into carbon dioxide. It is suggested that the remaining nine-tenths of the oxygen absorbed unites chemically with certain unsaturated hydrocarbons in the coal.

The **effect** of this rapid absorption of oxygen, in the still air of badly ventilated places, in coal mines, as can be readily imagined, is to **deplete the oxygen** content of the air. This is especially the case where tons of coal are shot down at night and left to be loaded out the following day and the ventilation during the night is much diminished in the mine.

On the other hand, where the ventilation is adequate and there is still blackdamp produced in quantity, it is the result of the generation of carbon dioxide from some cause—generally a mine fire or the slow combustion of fine coal.

AFTERDAMP

The term "afterdamp," as the word implies, is used to describe the variable mixture of noxious gases that remains after any explosion of gas, dust or powder in a mine.

Composition—It is impossible to give the composition of afterdamp, except in the most general way; because the gases formed depend on so many **varying conditions,** in respect to the character of the gas or dust burned; the relative volume of available oxygen; the size of the workings where the explosion takes place, as determining the temperature and pressure developed; and the condition of the mine with respect to gas, dust and moisture.

Afterdamp may contain variable quantities of nitrogen, carbon dioxide, carbon monoxide, water vapor and, at times, lesser amounts of nitrous oxide gas and possibly some unburned methane. The mixture is extremely dangerous, being fatal to life and often highly explosive.

Inquiries of General Interest

Firing a Boiler with Gas from a Blower

Kindly state if it is advisable to utilize a strong gas blower for heating steam boilers, instead of using coal as fuel. There is a strong gas well within 500 ft. of our boiler plant, at the mine. We think that it is producing sufficient gas to fire two boilers of the return-tubular type and 150-hp. units. If this is feasible, kindly explain the best method of fitting a burner under the boilers in order to burn the gas economically and get the best results.

I should be pleased to have you or some of the readers of COAL AGE explain and show by sketch how to equip these boilers for burning the gas, and how to regulate the supply of free air required for the combustion of the gas under the boilers.

FIREMAN.

———, Penn.

There is always a great saving in fuel accomplished when it is possible to utilize a gas blower for the firing of boilers. Any type of boiler may be fired in this manner, but success depends largely on the proper installation of the burner so as to give the highest efficiency. Different types of boilers need different treatment in this regard.

In the use of gas as fuel, it is necessary to protect the boiler plates above low-water line with firebrick or clay that will stand a high temperature. The furnace must be so arranged as to exclude all air except what is admitted for the proper combustion of the gas. The furnace must be well built and constructed of material that will withstand the high temperature developed in the burning of the gas.

The accompanying diagram shows the general arrangement of the system. The gas is piped to the furnace through the main header *H*. This pipe must be of sufficient capacity to supply the required quantity of gas. Its area should not be less than the combined areas of all the burner connections. As shown in the diagram, the header is carried along the front of the boiler and small pipe connections *C* convey the gas to the burners *B*, under the boiler. There is a large valve *V* in the main header, to control the supply of gas to the furnace, and smaller valves V_1 control the supply to each burner. This is important in order to obtain a uniform distribution of the flame in all parts of the combustion zone referred to later.

The number of burners used under a boiler can only be determined by the size and type of boiler in use. There should be, however, a sufficient number of burners to give a good distribution of flame in the furnace. A baffle-plate *P*, built in checkerboard fashion with openings between the bricks, is placed from 3 to 5 ft. in front of the burners, inside the furnace. The purpose of this is to give a greater diffusion of the gas and render its combustion more complete, besides forming what is termed a "combustion zone" *Z*, between the baffle-plate and the burners where the gas is burned.

The radiation of the heat into this combustion zone facilitates the combustion of the gas. It is important that thorough combustion take place in this zone before the gases come in contact with the cooler surfaces beyond, in order to avoid the deposition of unburned carbon in the tubes and on the furnace walls. As shown in the figure, a layer of firebrick *F* is also made to cover the grate surface in the combustion zone, which adds greatly to the radiation of the heat.

Where it is desired to install the burners in such a manner as not to interfere with the burning of coal in the furnace, at times when desired, the gas burners should be

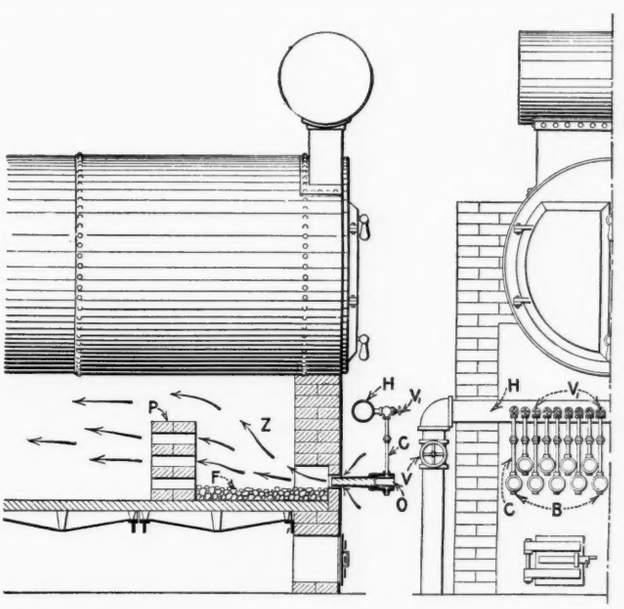


DIAGRAM SHOWING GENERAL ARRANGEMENT OF GAS BURNERS UNDER A RETURN-TUBULAR BOILER

placed above the furnace doors. Otherwise, these doors can be removed and the burners set in their place. As indicated in the diagram, gas enters the burner through the small pipe connections *C*. Air is admitted chiefly through the opening *O* in the ends of the burner closed by an adjustable shutter. By this means, the supply of air is regulated according to need. An annular opening close to where the burner enters the brickwork also permits air to enter at that point continuously, which has the effect to keep the tip of the burner cool and protect it from the intense heat of the furnace. The entry of air at this point is indicated by the small arrows, in the figure. An important feature in the Winner gas burner is the fact that the bore of the burner is rifled in such a manner as to give a rotary motion to the gas and air flowing through it. This greatly facilitates the mixing of the gas with the air and gives a more perfect combustion. The installation shown above was made by removing the furnace doors and building up the opening with brick.

Examination Questions

Alabama First-Class Mine Foremen's Examination, Held Jan. 25-28, 1915

(*Selected Questions*)

Ques.—If the ventilation of a mine is insufficient, how may it be increased without increasing the power?

Ans.—Without increasing the power on the air, the circulation in a mine may be increased by cleaning up the air courses; removing all obstructions in crosscuts and breakthroughs; shortening the distance the air must travel; and splitting or dividing the air current wherever this is practicable. It is necessary that the sectional area of all crosscuts in entries and breakthroughs in rooms should be equal to that of the entries and airways.

Ques.—What instruction would you give in reference to the care and preparation of safety lamps before giving them to the workmen; and how would you instruct workmen as to their use?

Ans.—Every lamp should be carefully examined, cleaned and filled immediately after being brought out of the mine. This work should be done in the lamphouse by a competent lampman who is responsible for their safe keeping. Before being given to the workmen, each lamp should be trimmed, lighted and tested so as to reveal any defects in the lamp or any omission in the assembling of its parts.

No workman should be allowed to use a safety lamp in the mine until he has been shown how to handle the same and understands that the lamp is *not safe* when improperly used. He must be taught how to carry his lamp, to keep it in an upright position and shield it from a strong air current and exposure to dust and dirt. He must know how to adjust the flame and understand the importance of not permitting the lamp to smoke. He must be instructed to watch the flame of his lamp and shown how to detect gas by the appearance of the flame cap. He must be taught how to extinguish his lamp in case of necessity and instructed how to proceed in case the lamp fills with flame.

Ques.—In the examination of a mine, if a large territory was found to be filled with explosive gas what steps would you take to remove the same, a continuous air current being used?

Ans.—Place a danger signal at and guard every entrance to the mine, permitting no one to enter except those authorized to perform the work of removing the gas. Assuming that no one is in the mine, in company with competent firebosses equipped with safety lamps proceed to the intake end of the affected section of the mine.

If necessary and practicable, the air current passing into this section should now be increased by scaling the air entering other sections. The work of removing the gas should be conducted wholly from the intake end and should proceed slowly, sweeping the gas from each working place in order and giving time for its complete removal before proceeding to another place.

Much will depend on the character of the workings and the inclination of the seam. It may be necessary to erect special brattices, in order to dislodge the gas accumulated at the face of a pitch or chamber driven ahead of the air. As the work proceeds, careful tests must be made with the safety lamp to note the progress that is being made. In this manner, the work must be carried on until the entire section is free from gas. While performing the work, all safety lamps should be carefully protected against a rush of air that may occur at any moment, caused by a possible fall of roof in the workings.

Ques.—In mines having extremely tender roof, state what precaution you would adopt when introducing the various types of mining machines, in order to insure the safety of employees and economy of operation.

Ans.—It is most important, in mining coal with machines under tender roof, to adopt a systematic method of timbering. Posts should be set in rows not more than 3 or 4 ft. apart and parallel to the face. These posts should be staggered, that is to say, the posts in each row should be set so as to divide the distance between the posts in the preceding row. The distance between the coal face and the first row of timbers should not be greater than what is required for the machine to work freely.

In very bad roof, it may be necessary to set temporary posts close to the face or dividing the distance in which the machine works and to remove these and reset them as the machine is advanced. The coal should be well spragged as the cut is made. In adopting such a method at the face, the rooms should be driven double so that the machine can be taken in on one track and, after cutting across the face, taken out on another track. The width of opening and thickness of pillars will depend on the depth of the seam below the surface.

Ques.—State how the several mine gases may be detected. In what proportion in the air are they fatal to life? In what proportion do they extinguish light?

Ans.—Methane or marsh gas (CH_4) is detected in mine air, by the action and appearance of the flame of a safety lamp. This gas when present in the air causes a faint, pale blue cap to form at the tip and above the flame. The height of the cap increases with the percentage of gas present, until at about 5 per cent. the unbonneted Davy lamp fills with flame.

Carbon monoxide (CO) is best detected in mine air by observing its effect on small birds and mice, which are prostrated in a much shorter time than a person exposed to the same atmosphere. Carbon dioxide (CO_2) is detected by the dim burning or extinction of lamps in its presence. Hydrogen sulphide (H_2S) is detected by its smell.

The percentages of the nonpoisonous gases, methane and nitrogen, fatal to life are such as deplete the oxygen of the air to 7 per cent.; namely, CH_4, 66.5, and nitrogen, 93 per cent. But 18 per cent. of carbon dioxide or 0.5 per cent. of carbon monoxide are fatal, because of their poisonous qualities. An oil flame is extinguished in 14 per cent. of carbon dioxide.

Coal and Coke News

Washington, D. C.

While no official announcements on the subject have been given to the public, it seems to be generally understood that the new Trade Commission is likely to be severely restricted in its operations during the first few months of its existence. Congress was obliged to deal with such a mass of legislation during the last few days of the recent session that it left a good many things in an incomplete and unsatisfactory condition, and the Trade Commission was one of them.

The salaries of the Commissioners were provided for in the legislative, executive and judicial appropriation bill, but for the remainder of its functions, only some $300,000 was furnished while the Commission was obliged to take over the Bureau of Corporations. As the latter concern had been costing from $200,000 to $275,000, all of it for work that is expected to go on, the new appropriation clearly gives only a narrow margin for new undertakings. In particular, it seems out of the question to expect that there will be much available for conducting hearings and investigations.

One subject that the Commission had been expected to take up early in its career was that of existing conditions in the oil industry, it having been desired by various members of Congress that there should be an authoritative official finding as to the extent to which the dissolution of the Standard Oil Co. had resulted in genuine competition.

If this should be dealt with even in a preliminary way, there would be nothing for other work so that this would constitute the practical limit of what would be done. Perception of this situation has disappointed those who had looked for early work on industrial conditions, and has correspondingly pleased those who felt that early activity on the part of the Commission would be dangerous and consequently to be depreciated.

There have been some of both groups of thinkers on this topic in the coal industry, as there had been confident predictions that conditions in that line would be among the first to receive attention. While there has been no official statement on the subject by the Commission and no definite plans so far as learned have as yet been forecast, this proposal (for coal investigation or study) is generally regarded as having been necessarily deferred for a good while, so far as anything save a mere preliminary survey is concerned.

The Report of the Commission on Industrial Relations

Meantime, the Commission on Industrial Relations is expected to report. As is well known, this commission has devoted considerable time and attention to the coal industry and the expectation is that conclusions regarding the business will, therefore, figure largely in what may be stated to Congress as a result of the work done by it.

Apparently, the Commission has of late leaned heavily to the side of extreme radicalism, and as most of its work has been done through "hearings," there is a general expectation that it will not develop much in its report except the familiar facts regarding the Colorado, and other coal situations that have already been made known by witnesses who testified at public sessions.

The Commission will doubtless, like all other bodies of the same sort, leave behind it, for use by others, the papers, data and other information remaining over from its work. The Trade Commission is believed by many to be likely to fall heir to these, so that whatever has been done with regard to the coal industry by the Industrial Relations Commission may in that case afford the basis for such further development as the Trade Commission may choose to give it.

Meanwhile, as already noted in this correspondence, most of the legislative mining and "conservation" program was left suspended when adjournment arrived on Mar. 4, and will have to be reintroduced at the opening of the next session. When that time arrives, the proposed measures will probably be referred to the Commission, just as railroad bills have for a good while been customarily sent to the Interstate Commerce Commission for its report or expression of opinion before action was taken on the floor. In this way, therefore, the Trade Commission may be able, from the very first, to exercise an important, even if indirect, influence upon the direction of Federal policy regarding the mining business.

Probable Revival of Rate Cases

Careful observers of the trend of events in Interstate Commerce Commission affairs are of the opinion that the next few months will be likely to see a revival of the attempt to secure further rate concessions in the interest of the railroads. The express companies have, within the past few days, filed with the Commission a petition for the revision and improvement of the rates granted them and there is more and more reason to fear that the 5 per cent. rate advance already granted the roads will not suffice to put their revenues into satisfactory condition.

It is believed that, should this effort to get better rates be undertaken, a feature of it would be the discussion of an increase on heavy commodities such as coal, which were largely exempted in the 5 per cent. decision. As yet, the matter is purely speculative, there having been no definite announcements as to what may be expected in the matter. The situation is admitted to depend largely on the developments as to railroad revenues in the near future. These will be largely affected by the export situation growing out of the European war.

Alaska Railroad Route Is Undetermined

There has thus far been no announcement of any decision regarding the choice of a route for the new government coal road in Alaska, although one is expected shortly to be forthcoming. Whether, in the present depleted state of the Treasury, anything immediate could now be done on a large scale by way of construction, even if all were ready to proceed, is believed by many to be questionable.

Revenues have not recovered since the beginning of the war, and the war taxes of last autumn are yielding less than had been expected. It cannot yet be stated what the yield of the income tax will be, but unless that is larger than generally expected, there may be a disposition to avoid heavy new expense commitments so far as practicable, in order not to increase the large outlays made inevitable on other accounts by the appropriations of Congress.

PENNSYLVANIA

Anthracite

Pittston—The Lehigh Valley Coal Co. is testing the thickness of the coal under its tract in Moosic Borough and may sink a shaft there. The tract comprises 400 acres and is known as the Bramwell property. Only the Red Ash vein, lowest in the Pittston region, underlies the land. Mining will depend on the thickness of the coal. If a shaft is sunk, the coal would be removed overland to the Heidleberg breaker.

Wilkes-Barre—What was probably the first arrest of its kind in this vicinity occurred Mar. 24, when Stanley Mookimas was arrested upon a warrant, charging him with having worn a button of local No. 1407, United Mine Workers of America, without being entitled to wear it. Mookimas appeared at No. 5 colliery of the Lehigh & Wilkes-Barre Coal Co., it is alleged, wearing the union button in violation of the union's constitution and by-laws and the state law.

The annual mining institute dinner, which is always the largest dinner in the city during the year, will be held in Irem Temple Wednesday May 5. The program committee is now making arrangements. Judge John M. Garman, will be toastmaster.

Bituminous

Uniontown—In the annual examinations for mine foremen and fire bosses certificates in the bituminous region this year, special emphasis will be laid on character. This will count as much as mental ability. No man who is not temperate in his habits can hope to get his papers, is the verdict of the mine inspectors.

Connellsville—Persons living on the North end of 10th St., have received notices from the H. C. Frick Coke Co. that the coal is being removed from under their residences and the ribs are to be pulled. The coal in this branch of the Davidson mine is just about exhausted, at least in the portion under Greenwood. If the surface should sink the gas connections are in danger of being broken.

Traffic in coke continues to show slight gains, the present production being in the vicinity of 280,000 tons per week. While the business being handled is not heavy, the improvement has been steady for some time. Mills are now taking more fuel than was expected in view of the restricted railroad buying of their products.

Marianna—The relief work in behalf of the destitute miners and their families was recently placed on a sound footing when a check for $1000 was received by the committee from the Union Trust Co., of Pittsburgh. This, together with other contributions recently received, amounts to $3000, which it is said will be enough to carry the relief work through until Apr. 1, when it is expected the mines will re-open in part, at least.

Johnstown—Rumors are current that the United Coal Co. mines in Jerome, Boswell and Elklick, in Somerset County, are to be taken back by the Merchant Coal Co., of Baltimore, which sold them to the Kuhn interests of Pittsburgh five years ago. It is believed that this indicates an early resumption of work at the mines and a heavy shipment of coal from Somerset County to Baltimore for export.

WEST VIRGINIA

Williamson—Extensive developments in the Guyan River, Piney and Cow Creek districts are planned by operators from the Pocahontas and Thacker fields, Logan and Wyoming counties being involved. The Pocahontas Co., it is understood, has closed a dozen leases, covering 20,000 acres of virgin coal land on Guyan River, which will be developed during the year, while Col. Wm. Leckie, of Welch, W. Va., has acquired control of about 5000 acres from John W. McCreary. Other operators are also interested. To handle the traffic the Chesapeake & Ohio Ry. Co. will extend its line to the new developments, and will also build a branch on Piney Creek.

Charleston—There continues to be considerable inquiry from persons believed to represent Eastern capital, also some from the Middle West, for West Virginia coal tracts, a large number of which are on the market at prices which are considered bargains because the financial depression in the state has put the original buyers of these tracts in need of cash. Many of these tracts were originally taken up and blocked out.

Miners of the Cabin Creek district have asked their officials to call a meeting to consider whether they will make a demand on the operators for an increase in wages. The miners, it is understood, claim an increase is due them by an agreement entered into at the end of the 1913 strike. The operators, on the other hand, claim they will not consider a change from the present scale.

Wheeling—The summer meeting of the West Virginia Mining Institute will be held here on June 15 and 16. The affair promises to be the largest meeting of coal interests ever held here.

Mullins—A large number of new operations are in process of development around Mullins. Many of the best known coal men in southern West Virginia have become interested in the town, and it is expected that it will shortly spring into prominence as one of the leading coal-field towns of the state.

Crown Hill—A part of the mine equipment and commissary stock of the National Bituminous Coal and Coke Co. will be sold at public auction at the front door of the courthouse on the morning of Apr. 10. The sale is to be made by Constable G. D. Acree in accordance with a warrant issued at the instance of Julian M. Johnson and others.

ALABAMA

Ensley—The work of repairing the Tennessee Coal & Iron Co.'s hospital which was badly injured by fire last month, has been completed and the patients moved back from Muscoga mines near Bessemer, where they have been since the accident.

Birmingham—The Alabama Safety Association, composed of mine officials and coal miners, will hold a Field Day at Richwood Park in Birmingham May 29. The program will comprise first aid drills and other demonstrations made above ground. The next meet of the American Mine Safety Association, this year, will probably be in Birmingham as the Secretary-Treasurer H. M. Wilson favors this place of meeting.

Republic—First Aid Corps from Palos, Warner and Sayreton mines of the Republic Iron & Steel Co. held a general Field Day recently at Republic.

Gadsden—Tom Peters Henley, through his attorneys, has filed suit in the Circuit Court of Walker County to recover 7160 acres of coal and mineral land in Walker County, now held by Gen. E. W. Rucker, a prominent Birmingham capitalist and coal operator. The land is estimated to be worth $200,000. The complaint in the action filed contains only nine lines and does not set forth any of the details under which the claim is made.

KENTUCKY

Harlan—The Wilhoit Coal Co. at Yokum's Creek made an increase of 500 tons of coal per day recently, so that the daily output is now 1000 tons instead of 500. The report is circulating that the coal business is increasing nicely throughout the Cumberland River, or Harlan coal field.

Nolansburg—The Golden Ash Coal Co. announces an increase in mining operations to 7000 tons daily. It also plans other increases from time to time during the year.

Whitesburg—The plants of the Consolidation Coal Co. and the Elk Horn Mining Corporation in the Jenkins-Burdine-Fleming-McRoberts fields are increasing their output. Beginning Apr. 1 it is said that every mine will operate at full capacity. The coal shipments over both the Baltimore & Ohio and the Lexington & Eastern railroads are getting heavy—both lines being practically taxed to the limit.

OHIO

Lisbon—The Lisbon Coal Co., which has recently been reorganized will soon open a new mine near the Erie tracks. The company has been operating a small mine for several years. A switch will be built to the mine.

Crooksville—The announcement has been made that operations at the W. P. Rend mine have been suspended indefinitely throwing 100 miners out of employment.

St. Clairsville—James A. Paisely, of St. Clairsville has sold a tract of coal land in Belmont county to the Valley Camp Coal Co. for $75,000. It is said that the new owners will try to develope the property if labor troubles are straightened out.

INDIANA

Evansville—H. P. Allen, manager of the Deep Water Coal Co. of this city states that his company, within 90 days, will close options on 210,000 acres of coal lands in western and central Kentucky. It is said the price paid exceeds $5,000,000. Eastern capital is interested in the venture. A large coal tipple and dock will be built on the Ohio River, a few miles below this city and barges will be loaded there for Southern markets.

Clinton—Work has been begun at the Hugh Shirkie mine No. 1, near Shirkieville, to uncover the fan, fan engine and the building in which they stood, which were all buried by a cave-in. It was at first proposed to dig a new air shaft but it was finally decided to remove the dirt through the entries at the bottom. The damage is estimated a $15,000.

Oakland City—The Ayrshire mine, No. 1 closed down Apr. 1, it having been found that mines Nos. 5 and 7 could take care of the present volume of trade.

ILLINOIS

Ottawa—The LaSalle shaft was recently closed down on account of slackness in the coal business. This mine employs about 300 men, but the majority will be distributed among other mines, of the LaSalle County Carbon Coal Co. in this vicinity.

Nashville—Local capital is organizing a coal company to sink a mine one quarter of a mile west of here, on a piece of property between the Louisville & Nashville and Illinois Southern railroads. Several hundred acres of coal rights have been acquired, and the movement is well under way.

WYOMING

Cumberland—The Union Pacific Coal Co. has ordered the output of its coal mines here increased 500 tons daily. Fifty additional miners will be employed at once. About 500 men are at present employed.

TEXAS

Sierra Blanca—It has been announced that a large bed of high-grade coal has been discovered near here. Plans are now on foot to develop the property and to construct a railroad from Sierra Blanca to the mines, a distance of about 28 miles. This coal deposit is about 75 miles west of the field which was exploited several years ago by a syndicate of Pittsburgh men.

PERSONALS

George Watkin Evans, consulting mining engineer of Seattle, during the latter part of March, visited southeastern Alaska on professional business.

Charles Dorrance, general manager of the Harwood Coal Co., has resigned to become assistant general manager of the Delaware & Hudson Coal Company.

Edwin Staley, formerly with the U. S. Bureau of Mines, has resigned in order to take charge of the office details of the Mine Safety Appliance Co., Pittsburgh, Penn.

B. R. Lindsay, formerly connected with the mining department of the Cambria Steel Co., as assistant superintendent of the Rolling Mill mine, has accepted a position at the Bowood mine of the Republic Iron & Steel Co.

Captain W. A. May, president of the Pennsylvania and Hillside Coal Co., informed the City Planning Commissioners of Pittston, who conferred with him at Scranton, that the mines of the companies would undoubtedly work steadily until July at least.

Chas. A. Sine, of Royalton, Ill., formerly general manager for John L. Mitchell's mining properties in Illinois, and J. B. Brown, manager of the Royalton mine, have resigned their positions to engage in the coal operating business at Sebree, Ky. They have acquired a mine at that place and are refitting it and expect to start operations shortly.

Alfred Kauffmann is now vice-president of the Link-Belt Co. in charge of operations at Indianapolis. Mr. Kauffmann served in the engineering department at Philadelphia for a number of years, from which he was promoted to take charge of the erection work of the company. He then proceeded to the sales department, looking after the coal mining business in the East, and particularly in the West Virginia field. His many friends in this industry will be glad to learn that in recognition of his competent and able work he has been elected vice-president of the Link-Belt Co.

OBITUARY

Simon Jones, identified for years with the mining interests of Kentucky, died at the age of 74 at his home in Render, Ky., after a long illness. A native of South Wales he came to this country in 1869 and was employed at St. Marys, Ind., Tamara, Ill., and Newburg, Ind. He then went to Earlington, Ky., where he opened the first mine for the St. Bernard Mining Co. in 1871. He became associated with the old Render Coal Co., in 1872 and remained with the Central Coal & Iron Co. when that concern absorbed the Render company.

RECENT COAL AND COKE PATENTS

Stoker. E. P. Stevens, Chicago, Ill. 1,127,940 Feb. 9, 1915. Filed Sept. 25, 1913. Serial No. 791,690.

Furnace Grate. A. Cotton, Newark, N. J. 1,117,795, Nov. 17, 1914. Filed Feb. 18, 1914. Serial No. 819,653.

Boiler Furnace. F. J. Widman, Chicago, Ill. 1,129,825 Feb. 23, 1915. Filed Jan. 7, 1914. Serial No. 810,832.

Coal Shifter. W. L. Marberry, St. Louis, Mo. 1,117,875, Nov. 17, 1914. Filed Apr. 3, 1914. Serial No. 829,391.

Coal Drill. J. G. Huntley, West Pittston, Penn. 1,128,878 Feb. 16, 1915. Filed Aug. 3, 1914. Serial No. 854,759.

Mechanical Stoker. A. G. Elvin, Somerville, N. J. 1,128,428 Feb. 16, 1915. Filed Oct. 21, 1913. Serial No. 796,377.

Smoke Consumer. A. E. Wilson, Indianapolis, Ind. 1,129,151 Feb. 23, 1915. Filed Aug. 14, 1914. Serial No. 856,740.

Rotating Mechanical Stoker. S. H. Dunning, Paterson, N. J. 1,118,748, Nov. 24, 1914. Filed July 16, 1914. Serial No. 851,243.

Coal Loading Device. W. W. Jamison, Greensburg, Penn. 1,128,880. Feb. 16,1915. Filed July 2, 1913. Serial No. 776,930.

Grate Construction for Furnaces. C. L. Davidson, New York, N. Y. 1,129,172. Feb. 23, 1915. Filed Aug. 15, 1911. Serial No. 644,097.

Leveler for Charges in Coke Ovens. D. F. Lepley, Connellsville, Penn. 1,129,352 Feb. 23, 1915. Filed Aug. 31, 1910. Serial No. 579,856.

Locomotive Fire Box. J. T. Anthony, assignor to American Arch Co., New York, N. Y. 1,118,615, Nov. 24, 1914. Filed Oct. 1, 1913. Serial No. 792,807.

Water Tube Boiler. J. E. Bell, assignor to Babcock & Wilcox Co., New York, N. Y. 1,129,538 Feb. 23, 1915. Filed July 8, 1907. Serial No. 382,588.

Mechanical Stoker for Promoting Smokeless Combustion. K. Yano, Oaza, Japan. 1,116,664, Nov. 10, 1914. Filed June 26, 1912. Serial No. 705,905.

Chain Grate Stoker. W. A. Jones, assignor to Babcock & Wilcox Co., Bayonne, N. J. 1,117,395, Nov. 17, 1914. Filed Feb. 3, 1913. Serial No. 745,776.

Steam Boiler Furnace. J. Wolff, assignor to Babcock & Wilcox Co., New York, N. Y. 1,129,534 Feb. 23, 1915. Filed Jan. 2, 1913. Serial No. 739,684.

Mining Machinery. C. O. Bemies, McClellandtown, Penn., and J. F. Bemies, New York, N. Y. 1,127,395 Feb. 9, 1915. Filed Nov. 7, 1910. Serial No. 591,031.

Means for Saving Fuel and Promoting Combustion in Furnaces. W. B. Evans, Philadelphia, Penn. 1,129,656 Feb. 23, 1915. Filed Nov. 28, 1913. Serial No. 803,496.

TRADE CATALOGS

Mayer Bros. Co., Mankato, Minn. Folder. "Little Giant" power hammer. Illustrated.

The Blaisdell Machinery Co., Bradford, Penn. Loose Leaf Catalog. "Air compressors, vacuum cleaners." Illustrated, 6x9 in.

The Jeffrey Mfg. Co., Columbus, Ohio. Bulletin No. 129-A. "Jeffrey Arc Wall Coal Cutters for Over Cutting System of Mining." Eleven pages, 8x10 in., illustrated.

The Sanford Reilly Stoker Co., Ltd., Worcester, Mass. "Reilly Self-Dumping Underfeed Stoker." Thirty six pages, 6x9 in., illustrating and describing the Reilly stoker and installations thereof.

NEW PUBLICATIONS

Illinois State Geological Survey, Bulletin No. 24, "Deep Borings," by J. A. Udden. Cloth bound volume of 141 pages, 6x9 in., with drawings and insert maps.

Department of the Interior, U. S. Geological Survey, Water Supply Paper 365. "Ground Water in Southeastern Nevada," by Everett Carpenter. 86 pages, 6x9 in., illustrated.

Department of the Interior, Bureau of Mines, Bulletin 90. "Abstract of Current Decisions on Mines and Mining, December 1913 to December 1914." by J. W. Thompson. 176 pages, 6x9 in. unillustrated.

Department of the Interior, Bureau of Mines, Technical Paper 99. "Probable Effect of the War in Europe on the Ceramic Industries of the United States," by A. S. Watts. Fifteen pages, 6x9 in., unillustrated.

CONSTRUCTION NEWS

Linton, Ind.—A mine will be sunk on the 500 acres recently purchased three miles southwest of this city, by the Fourth Vein Coal Co. It will employ 400 people.

Mullens, W. Va.—W. H. Thomas, of Bramwell, W. Va., is making arrangements to start work at once on the Iroquois mine, on Winding Gulf Creek. The property will be placed in operation as soon as possible.

Scranton, Penn.—Work was recently begun in re-timbering the shaft of the Conklin mine, formerly the Clearview, by Markwick & Co. Later on the shaft will be sunk 250 ft. deeper so that coal in the Clark vein may be mined.

Baxter, W. Va.—The store building of the New Central Coal Co., at Baxter, which burned down some weeks ago, is now being rebuilt. The structure which will be about the size of the former building and two stories high, will be of concrete. It is being built on the same location as the building which was destroyed.

Barbourville, Ky.—Contracts are being placed for cross ties and other materials to be used in the Barbourville-Manchester extension of the Louisville & Nashville R.R., with every prospect that actual construction work will begin inside the next two months. Clay County supporters of the project have secured rights-of-way in that county and have raised a bonus of $50,000 and rights-of-way are now being signed in Knox County, while engineers are to go over the proposed route immediately.

Huntington, W. Va.—It is reported that 20 new coal companies will begin operations in Raleigh and Wyoming Counties within a short time. Of 30,000 acres of undeveloped coal land in the Winding Gulf section, approximately 23,000 acres will be developed within the next few months. Both the Virginian and Chesapeake & Ohio railroads are planning extensions, the former starting from Stone Coal Junction and extending up Stone Coal Creek, and the latter building from Woodpeck up Piney Creek.

Bearcreek, Mont.—Developments and improvements of considerable significance have been planned by the International Coal Co. The plans contemplate the tapping of the No. 4 vein at the International Plant. This will be the first time that this measure has been touched on the Bearcreek side. It is expected that by fall the new slope will be completed, a new electric system for handling the coal underground installed, and perhaps a new tipple built. This will increase the out put of the International by some 400 tons per day, and increase the working force from 160 to 200 men.

NEW INCORPORATIONS

Tacoma, Wash.—The Ozark Coal Mining Co. has been incorporated with a capital stock of $400,000. The incorporators are E. Hutchinson, D. W. Watkins and C. C. Leigh.

Pekin, Ill.—The Ubben Coal Co. has been organized with a capital stock of $25,000 to engage in coal mining. The incorporators are A. U. Ubben, Theodore H. Ubben and John Bonk.

Terre Haute, Ind.—The Vigo Mining Co., of Terre Haute, was recently incorporated with a capital of $50,000. The directors are J. G. Van Winkle, Samuel D. Royse and M. E. Godley.

Cincinnati, Ohio—The Matthew Addy Co. has been incorporated with a capital of $100,000 to mine and deal in coal, iron and coke by James A. Green, Louise Coy Green, Benj. N. Ford, A. Burt Champion and Leland G. Banning.

Charleston, W. Va.—A charter to do business in West Virginia was recently granted to the Loraine Coal & Dock Co. with head-quarters at Columbus, Ohio. It is the intention of this firm to develop coal mines in Logan County.

INDUSTRIAL NEWS

Bridgeport, Conn.—The Bridgeport Brass Co. is erecting an addition to its plant, necessitated by its increasing business.

Pittsburgh, Penn.—The Chas. T. Topping Machinery Co., dealers in contractors, mine and quarry equipment, announces the removal of its offices to Suite 928, Oliver Building.

Birmingham, Ala.—The Montgomery Coal Washer Co. announces that it has closed a contract with the National Coal Co., with general offices at Seattle, for a 300-ton washer, at a cost of about $9000.

Buffalo, N. Y.—The Buffalo & Susquehanna R.R., between Buffalo and Wellsville, will be continued until July 1 by court order. The line was some time ago ordered abandoned, but stays have been granted in the hope of selling it.

Grafton, W. Va.—A supplementary contract or agreement has been made by the Sterling Coal Co., of West Virginia and Ohio, making its property security for a bond issue of $2,500,000, which was issued in 1910 by the Guardian Savings & Trust Co., of Cleveland.

Juneau, Alaska—The United States Land Office has announced the cancellation of 47 coal claims in the Christopher group in the Behring River coal field. These claims cover 7000 acres which were held to have been fraudulently located.

Morgantown, W. Va.—According to reports received at the headquarters of the United Mine Workers, preparation for the opening of the spring trade is being made by local coal operators and the opening of navigation on the Lakes will find all the mines in the district working to the limit of their capacity.

Port Jervis, N. Y.—It is stated that coal in paying quantities has been discovered in the hills near this city by the North American Exploration Co., and that work will be started shortly on a drift to reach the coal measure. If this verifies reports on diamond drill borings submitted to mining engineers, coal mining will be started.

Offutt, Ky.—The large commissary owned by the Royal Colliery Coal Co. at Offutt, Ky., was recently entered by burglars and several hundred dollars' worth of merchandise was stolen. An attempt to blow the safe proved fruitless. Dynamite was found in the crevices near the hinges. The goods stolen consisted of clothing, shoes and pistols.

Buffalo, N. Y.—The Delaware, Lackawanna & Western R.R Co., which was ordered to remove its coal trestle on north pier by Apr. 1, has asked the government to be allowed to remove the structure 60 ft. back, thus allowing a wider harbor entrance and not interfering with navigation. It seems likely that a compromise will be reached on this basis.

Martins Ferry, Ohio—A deal was recently consummated whereby a company known as the Burlington Coal Co. became the owners of the Miles Megrail Coal Co. The amount changing hands as a result of the deal was not made public, but it is thought to have been considerable. The new owners will take possession shortly and a new tipple, office and barn will be erected and a number of other improvements will be made by the new firm.

Columbus, Ohio—Charles Seidenfeld, president of the Seidenfeld-Hammond Coal Co., of Columbus, announces that after Apr. 1 the executive offices of the company will be moved to the location of the operating offices, at Murray City, Ohio. Mr. Seidenfeld some time ago acquired the interests of E. H. Hammond in the company and has also taken over the entire ownership of the Skidmore Coal Co., of Rutland, Ohio. These companies will be operated separately.

Washington, D. C.—West Virginia coal operators from all parts of the state recently met in Washington to take preliminary steps looking to united action to protect the coal industry. Another meeting will follow shortly at which an organization will be formed to resist encroachments on the rights of coal men. It seems to be the consensus of opinion that something must be done to prevent attacks on the coal industry, state legislation evidently being held principally in view.

Bluefield, W. Va.—At the recent meeting of the Pocahontas Fuel Co., it was decided to establish a line of ships to ply between Hampton Roads and the New England coast, and engage in making coal deliveries for the company. It is understood that the new firm, or rather the subsidiary company, will be known as the Pocahontas Navigation Co., and it is expected that by the expiration of the present contract for transportation, the Pocahontas Navigation Co. will be ready for business.

Philadelphia, Penn.—The Circuit Court of Appeals on Mar. 26 dismissed a petition for rehearing in the case of Charles A. Otis, et al, plaintiff in error, versus the Pittsburgh Westmoreland Coal Co. in the Western District Court. In the petition filed by Otis, it was indicated that the Appellate Court had affirmed a judgment upon two equally inconsistent grounds, first as to acceptance, because the bonds in suit were taken under the written contract, and second, as to termination because they were so taken.

Charleston, W. Va.—The statement of the shipments of coal and coke over the lines of the N. & W. Ry. for the month of February and the two months of the current year, has just been made public. The statement shows 1,689,606 tons shipped during the month, as against 1,762,344 tons during the same month last year, a decrease of 72,738 tons. For the two months of the year 3,646,759 tons were shipped over the lines, as compared with 3,846,903 tons during the same period in 1914, a decrease of 200,144 tons.

Pittston, Penn.—Mayor M. N. Donnelly will appoint a committee of business men to solicit subscriptions to purchase the coal under the Reap property, which the government proposes to buy for a Federal building site, and to present the title to the mineral rights to the government. Purchase of the coal by the government would make the price exceed the appropriation for the purpose. The company asks $10,000 for the underlying mineral but the mayor believes the government will be satisfied with less than the entire amount of coal or sufficient to give surface support.

Huntington, W. Va.—According to plans presented at a recent meeting of stockholders at Ashland, Ky., various coal companies operating in the Big Sandy and Kentucky River valleys, whose aggregate capital amounts to about $3,500,000, will be incorporated as the Kentucky Coal Corporation. The companies concerned in this merger include the Letcher Coal & Coke Co., the Slemp Coal Co., the Henry Coal & Coke Co., the Haley Coal Co. and the Kentucky River Consolidated Coal Co. It is understood that the new company expects to start extensive new developments in the Big Sandy and Kentucky valleys as soon as the organization is perfected.

Coal Trade Reviews

General Review

Anthracite buying lacks the customary vigor that should characterize the opening prices. Bituminous continues dull and contracting is slow. Current sales substantially below normal and some agencies are attempting to force the market.

While the opening of the new coal year finds a large volume of anthracite coal moving it is clear that the season is not starting up with the customary snap. There is a large amount of coal in all directions, and buyers will have no difficulty in getting full shipments of any description they require. Now that the large companies are quoting the minimum price of the year, the dealer demand has shifted from the individuals, but buyers are failing to respond to low quotations with the usual vigor and the situation is replete with uncertainties. Interest is centering principally on the steam grades; the stocks of the large companies are all cleaned out of these sizes, and there is some anxiety as to the supply during the summer.

The Eastern bituminous trade is devoid of interest. Some buyers are apparently trying to force the market with low prices, but with indifferent success, while others have about made up their minds to await further developments. Very cheap coal is being offered at nearly all of the distributing centers, and current receipts are absorbed with considerable difficulty. A turn for the better in ocean freights, together with the exceedingly high prices ruling on Cardiff coals, has caused a better outlook in the foreign trade, and there are already an increasing number of vessels moving to South American points; a number of coastwise boats are also going into this trade as fast as they can be released.

Though consumption has increased somewhat in the Pittsburgh district, it is clear that the production has been advanced faster than conditions warranted and there is a decidedly depressed situation with a large surplus of free coal. Contracting is proceeding very slowly, and operators are showing a disposition to make attractive offers to induce business, but consumers are strongly inclined to withhold contracts and confine their purchases to the prompt market.

Production in Ohio continues at an exceptionally low ebb and the situation is still generally weak on all grades with little hopes for any improvement in the immediate future. Dealers' requisitions are at a minimum, while expiring steam contracts are being renewed with the greatest difficulty. Steam coals are scarce in the Southern market due to the limited work at the mines. The outlook for the summer stocking is regarded as unfavorable because of the unusually low prices ruling throughout the past year.

Sales throughout the Middle West are substantially below normal, and the beginning of this month finds a number of mines in certain districts closing down indefinitely pending an improvement in the market. A large number of contracts have been let at moderate recessions on last year's figures while prices generally are varying over a large range; collections are also slow. The market is being maintained only by the most rigid curtailment in production.

ATLANTIC SEABOARD

BOSTON

April opens with a mid-summer market. Pocahontas and New River cargoes arrive "on the market." Little doing on contracts. Georges Creek and the Pennsylvania grades also dull. Sailing vessels chartering for South America. Anthracite companies accept April business without reservation.

Bituminous—April finds the Pocahontas and New River market as lifeless as in July. There are few favorable sides to the situation; both f.o.b. and alongside there is no demand worth mentioning. Even coal for contract application is very dull and cargoes continue to arrive without orders. No new business of any size has been closed recently, although one of the largest power-house contracts is pending. Some of the shippers are striving to make prices that will induce buying but so far they have had little success. March was a mild month and stocks are still large in most directions. Buyers generally are holding off and several of the agencies have about decided to sit still and wait developments. The bids on the City of Boston harbor institutions later in the month are bound to be followed with much interest.

The export trade so far is not proving much help to the Hampton Roads shippers. Cargoes for South America are increasing in number but the vessels are mostly small. The high prices on Cardiff coals are expected to throw an extra demand on the Chesapeake Bay terminals but such demand seems to develop very slowly.

In Georges Creek, coal is accumulating at all the distributing points and a general curtailment is beginning to be enforced. Receipts here are absorbed only after delay, and inquiry is light.

The Pennsylvania grades also share the general dullness. The transportation that ordinarily brings the bulk of these coals here is just now engaged in the anthracite trade and that reduces the volume that will be received this month. Prices remain about the same, although most operations are under heavy curtailment. Coal comes down only on orders; few operators are now willing to stand the risk of demurrage at the loading ports. All-rail movement is only spasmodic.

Water Freights are still dull at 85@90c., Hampton Roads to Boston, on bottoms 2000 tons upwards. Sailing vessels are chartering on South American business as fast as they are free of coastwise engagements. Since these voyages are of three to four months' duration it takes them out of the New England market for most of the season. There is little enough inquiry, however, for the barges and steamers that are left and a further recession in rates is still looked for.

Anthracite shipments have come forward with a rush, so much so that many dealers are expecting to get their entire storage filled at minimum prices. There is apparently very little restriction this spring on the proportion of stove size in shipments and buyers are assured they can have about what they require. Individual shippers are holding out special inducements but the tonnage so far developed has been small. May has every appearance now of being a dull month in anthracite.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.90@1.40	$1.15@1.60	$1.67@1.77	
Philadelphia*.....	2.15@2.65	2.40@2.85	2.92@3.02	
New York*.....	2.45@2.95	2.70@3.15	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.50@2.75
Boston†.....	.....	.....	.....	3.65@3.83
Providence†.....	.....	.....	.....	3.55@3.73

* F.o.b. †On cars.

NEW YORK

General apathy in bituminous with contracting proceeding slowly. April anthracite business opening up slowly. Uncertainty in the steam grades. Holidays interfere with production.

Bituminous—The soft-coal market is more remarkable for its extreme apathy than anything else. Dullness prevails in all directions, with requisitions and contracts apparently down to an irreducible minimum, and no demand at all in the prompt market. The bunkering trade is fair, holding up somewhat better than anticipated, and coastwise water rates are practically back to a normal basis. Operating schedules at the mines continue at about half capacity.

In contracting circles, the principal feature of the week was the closing of the Lehigh Valley R.R. Co.'s contract involving about half a million tons. In general, contracting is proceeding slowly with concessions of various kinds still the rule. The prompt market continues quotable on the same basis as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—With the company circulars now down to the April schedule, dealers are shifting their orders from the individuals, with the result that the latter are feeling the effect of the restricted demand quite severely. The business during March was generally unsatisfactory, though this is usually the case during that month. The outlook for April is not very well defined as yet, but it will probably be lacking in the

customary activity that usually characterizes the period during which the lowest prices of the coal year are in effect. Buyers will be able to get all the shipments they desire and probably in any proportion that they want.

There is considerable speculation over the outlook for the steam grades during the summer. It is generally felt that with the mines on heavily curtailed working schedules, as now seems to be the outlook, there is liable to be an acute shortage of the steam sizes. Nearly all the companies have picked up their reserve stocks of buckwheat and with the storage piles cleaned up they will, in any event, have to depend on their current production in the future.

Mine operations during the past week were heavily restricted by the holidays. Eight-hour day on Thursday, and Good Friday resulted in a suspension on both of these days in most cases at all of the collieries while at a great many the holiday was carried on through Saturday and Sunday with a result that most of the companies got only three days during the week.

The New York hard-coal market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$4.60	$4.60	$4.55	$4.55
Egg	4.85	4.85	4.80	4.80
Stove	4.85	4.85	4.80	4.80
Chestnut	5.10	5.10	5.05	5.05
Pea	3.55	3.35@3.55	3.50	3.15@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.35@2.75
Rice	2.30	2.30@2.40	2.00@2.25	2.10@2.35
Barley	1.80	1.60@1.80	1.75	1.40@1.75

PHILADELPHIA

The anthracite market starts the season fairly active but there is an absence of the customary rush. Bituminous shows slight improvement here and there, as industrial conditions pick up.

Anthracite—There will be no surplus during the month of April, as practically every dealer is in the market for his requirements at the opening circular, but the fact still remains, that there is far from an optimistic feeling in either the wholesale or retail trade. Large dealers are predicting a slow market for the first three months of the coal year which is in sharp contrast with the conditions usually prevailing. Quite a large quantity of coal was carried over from the winter stocks, and there does not seem to be the usual disposition among householders to fill up their cellars at the spring prices.

The dealers are placing comparatively small orders for April shipment, as they do not expect a heavy demand, owing to the mild winter and the condition of the money market. This latter is receiving the particular attention of the retail men. Many of the dealers express the opinion that there will be no difficulty in securing all the coal they require at the April prices or even better, later in the season.

Bituminous—Here and there are indications of slight improvement in bituminous. The call for spot coal seems better, but this seems due to the fact that many purchasing agents are still combing the market for bargains, though it is also a fact that industrial conditions are slowly mending, and this would naturally have a tendency to improve the situation.

BALTIMORE

Bituminous business remains exceptionally quiet. Cool weather keeps up a small buying of anthracite. Foreign shipment prospects are good.

Bituminous is more or less of a drug on the market, as to spot business. Very cheap coal is offering at all of the mining centers. Fair grades of soft coal are offering in West Virginia and western Maryland as low as 85c., while the market for the less desirable kinds of coal is practically wiped out. Best coals are offering around $1.15 to $1.25. Pennsylvania low grade fuels are bringing from 85 to 95c., with best grades at about $1.20 and $1.25.

There is persistent demand for small quantities of hard coal for immediate household consumption. Most of the householders have reached the end of their winter supplies, and yet the weather has been very cool, the monthly average for March being about seven degrees below normal, with several days below freezing. Nut and pea coal have been the principal late sellers.

That April will be a good export month is indicated by the number of foreign charters. During the past week the following were noted: British steamer "Strathberg," to Sicily; bark "Bruce Hawkins," to Maranham, Brazil, at $5.70; British steamer "Holtye," to Geona; Italian steamer "Angelo Parido," to west coast of Italy, at $10.80; British steamer "American Transport," to River Plate, $9.60; schooner "Van Allens-Boughton," to River Plate, $8; British steamer "Westlands," to Alexandria, Egypt; British steamer "Llangollen," to Montevideo, $9.60.

TORONTO, CAN.

Dealers busy getting stocks cleaned up. Little coal coming in.

Trade is fair with a lessening demand for anthracite as the season advances. Stocks on hand are being reduced by dealers in view of stock-taking next month and anticipated fall in prices, and only a little coal is now coming forward. Quotations are as follows with some shading on wholesale bituminous: Retail anthracite egg, stove and nut, $8; grate, $7.75; pea, $6.75; bituminous steam, $5.25; screenings, $4.25@4.50; domestic lump, $6; cannel, $7.50; wholesale f.o.b. cars three-quarter lump, $3.80; screenings, $2.96.

OCEAN FREIGHTS

Steamers offering more freely and slight recessions are noted in rates.

A number of steamers have been chartered for export coal, some for South America and for the Mediterranean, at slight concessions under recently quoted figures. Steamers are offering more freely, but are being absorbed by various trades at rates slightly under those previously in effect.

To	Rate	To	Rate
Havana	**$2.75**	Guantanamo	$3.25@3.75
Cardenas or Sagua	3.50@3.75	Demerara	5.50@6.00
Cienfuegos	**3.00**	Bermuda	3.00@4.00
Port au Spain, Trinidad	**3.75**	Vera Cruz	**3.50**
St. Lucia	3.50@3.75	Tampico	**3.50**
St. Thomas	**3.25**	Rio	**10.20**
Barbados	**3.75**	Montevideo, Buenos Aires or La Plata	9.36@9.60
Kingston	3.00@3.25	Mediterranean*	10.80@12.00
Curacao	3.50@4.00	Valparaiso†	8.40@9.60
Santiago	3.25@3.75		

Note—Rates noted in **bold face** type are only approximate.
* To a direct port not east of the West coast of Italy, Spain, excluded.
† With 800 tons per day discharge.
W. W. Battie & Co.'s Coal Trade Freight Report.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Hilston (ship)		Atlantic Range	River Plate	1897	$8.00
Walden Abbey (ship)	Uruguay	Atlantic Range	River Plate	1754	
Domingos Joaquin de Silva (ship)	Uruguay	Atlantic Range	River Plate	1590	
Bruce Hawkins (bark)		Virginia	Maranham, Brazil	540	5.70
Wm. C. May		Virginia	Maranham, Brazil	607	5.75
Dean E. Brown		Philadelphia	Point-a-Pitre	621	
Benj. A. Van Blunt		Baltimore	Tampa	1132	1.85
Moama	British	Philadelphia	Fredericton, N. B.	384	2.50
Harold B. Cousens		Philadelphia	St. John, N. B.	360	1.50
Laertis	Greek	Atlantic Range	River Plate	2380	9.60
American Transport	British	Atlantic Range	River Plate	3003	
Angelo Parodi	Italian	Baltimore	West Coast, Italy	2488	10.80
Van Allens Boughton		Virginia	River Plate	1909	8.00
F. A. Allen		Philadelphia	Eastport	462	1.25
Melbourne P. Smith		Norfolk	Rio Janeiro	528	7.25
Rochdale	British	Atlantic Range	River Plate	2377	9.60
Llangollen	British	Baltimore	Montevideo	2446	9.60
Westlands	British	Baltimore	Alexandria	2001	
Balgray	British	Norfolk	Tampico	2318	
Berlin	Danish	Baltimore	Havana	1400	
Salaminia	Greek	Atlantic Range	River Plate	1983	9.60
Hazelmoor	British	Atlantic Range	River Plate	1979	
Boynton	British	Atlantic Range	River Plate	1630	
Sowwell	British	Baltimore	West Coast Italy	2430	12.00
Malcolm Baxter, Jr.		Hampton Roads	Rio Janeiro	1479	7.45
Anna R. Heidritter		Hampton Roads	Bermuda	610	3.25
Vancouver	British	Atlantic Range	River Plate	2860	9.48
Holtye	British	Baltimore	Genoa	2714	
Itasca		Philadelphia	Bangor	989	1.00
Josephine		Norfolk	Pernambuco	842	

Note—Steamers are indicated by **bold face type**, all others being schooners.

HAMPTON ROADS

Movement continues fair. Excess accumulation in railroad yards. Dumpings for March close to a million tons.

The dumpings over the tidewater piers during the week have shown up well. There have been large cargoes coastwise and while the export movement has not been as heavy as anticipated, at the same time some fair sized cargoes have moved to Cristobal, Rio de Janeiro, Havana, Iquique, Pernambuco, Santo Domingo and Genoa. The demand for Pocahontas and New River run-of-mine seems to be increasing somewhat although there is practically nothing doing with the high volatile or nut and slack. Export shipments are still being made by sailing vessels although during the last week the number sailing was not so great as the previous week.

Prices for the standard grades of New River and Pocahontas remain at circular with an excess accumulation in the railroad yards. One of the large coastwise colliers which has been in the foreign general cargo trade for several months, is again in the coastwise service having loaded about 7500 tons at Hampton Roads during the week. These large vessels are much more satisfactory to handle than barges or schooners and are dispatched much quicker in a majority of cases.

All of the coastwise movement of the week has been to the

New England market, the largest quantity going to Boston, Providence, Portland, Everett, Beverly, New Bedford, Portsmouth, and Lynn. Practically all of the coal moving has been New River and Pocahontas mine-run although there have been some small quantities of nut and slack and the high volatiles shipped on contracts.

From figures now obtainable the indications are that the dumpings for the month of March should amount to close around the million-ton mark.

Vessels clearing from Hampton Roads ports from March 19 to 26 inclusive, were:

Norfolk			Newport News		
Vessel	Tons	Destination	Vessel	Tons	Destination
Ocland	4800	Cristobal	**Tibagy**	3300	Pernambuco
Procida	5400	Genoa	**Olaf**	2500	Havana
Wm. Critchett	802	Santo Domingo		and 159	coke.
Napoli	5800	Genoa			
Rebecca Palmer	3505	Rio de Janeiro			
Celia	1241	Iquique			

Note—Steamers are indicated by **bold face type**, all others being schooners.

LAKE MARKETS

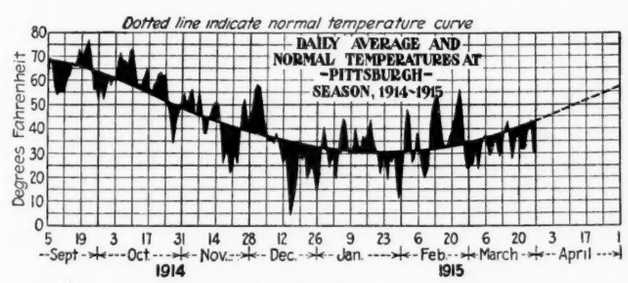
PITTSBURGH

Market still depressed with prices low and contracting proceeding very slowly. Mining continues at about 60% of capacity, with much free coal.

The local coal trade continues in decidedly depressed consideration, with a surplus of free coal and with contracting proceeding very slowly. There has obviously been a greater increase in the production of coal in the past two months than was warranted by conditions, even though the total consumption has improved somewhat, and sufficiently, indeed, to make up for the decreased domestic demand resulting from the progress of the season; domestic demand is now very light.

It is understood that while operators are ready to name very close prices on twelvemonth contracts, in general they are not disposed to give the railroads as much leeway as usual in making their fuel contracts. As a rule the railroads have fared better than other contract buyers in the past, and the coal producing trade is asking itself why this is, without finding an answer that is entirely satisfactory. Mining operations continue at about 60% of capacity.

Annual contracts are talked of as being based on about $1.15 for mine-run but the probability is that attractive contracts can be booked at a considerable fraction under this level. No prices are definitely spoken of yet in connection with the Lake trade and it may be some time before the Lake contracting season is regularly opened. For free coal the general range of prices realized seems to be the same as a week ago, as follows: Slack, 90c.@$1; nut and slack, 95c.@$1.05; nut, $1.05@1.10; mine-run, $1.05@1.10; ¾-in., $1.15; 1¼-in., $1.25, per net ton at mine.



BUFFALO

Contracts for bituminous scarce and prices low. Very little spot business developing. Large sales of pig-iron by local producers regarded as a hopeful sign. Anthracite more active.

Bituminous—Demand has not been gaining any momentum and all the agencies are reporting trade slow. A feeling of entire indifference on the subject of contracts prevails among consumers; there is a belief that business is to be poor throughout the year and consequently coal will be bought in the open market. Some large users are of course contracting as usual, but they are insisting on low prices; it is reported that they are meeting with success, though there is a feeling among many shippers that business will improve shortly and prices go higher. The Lake trade is not counted on for much this summer, but industrial conditions appear to be slowly mending. Coal on track is reported from leading Canadian centers, much to the injury of the market. Business in Canada remains poor and most factories are doing little.

The outlook for pig iron has been improved by the heavy sales which the local furnace interests have been making in New England; if pig iron revival is an indication of better business the situation is certainly encouraging. The business was taken at rather low figures, but furnaces have now advanced their quotations from $12 up to $12.50 for early delivery and $13 for delivery in the third-quarter of the year. Local furnaces will have plenty of business for some months to come.

Pittsburgh prices are uncertain at present and contracts are said to have been made at 5 to 10c. below the nominal figures which have been ruling for some time as follows: $2.80 for Pittsburgh select lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny Valley sizes about 25c. lower than Pittsburgh.

Anthracite—The April demand starts off fairly well, though orders are scarcely up to a year ago. The retail dealer had a poor month during March, so that buying was limited to immediate requirements. Now a good many find their bins about empty and are taking advantage of the low prices. A large amount of coal is above ground and orders will be filled more promptly than in most previous years.

Loading of anthracite into vessels has been going on rather slowly of late, though more companies are now beginning to take some storage coal. An inactive season at the start is the prediction and there will be no such rush as occurred last year. About 30 cargoes have been loaded thus far.

TOLEDO

Slack the feature of local market. Lake business will be slow in opening. Large amount of coal at the upper ports.

There is very little life in the trade but in a short time the usual spring and summer contracts will be open for bids which will create some activity. The first large contract will be that of the board of education; this is always a large contract and is usually let about April or May.

The general trade, both steam and domestic, is light. Slack is growing scarce and firmer as to price but this seems to be about the only feature of interest at the present time. The Lake trade will open late; the amount of coal carried over at the upper ports is so large that there is little prospect of Lake business opening much before July.

Coal shipped from the Pocahontas field to Cleveland in the future will be advanced 10c. per ton so that the Cleveland tariff will be on a level with the Toledo rate of $1.45 per ton. The new tariffs will be effective Apr. 12 and will be issued by the Pennsylvania and Big Four roads.

COLUMBUS

The trade continues featureless. Both domestic and steam demand are quiet. Lake trade will be slow in opening.

Weakness still characterizes the domestic trade and steam business is also at a low ebb. There appears to be little hope for improvement until the stocking season opens. The indications are that the Lake trade will be slow in opening because of the large surplus being carried over on the docks of the Northwest.

Dealers are only buying when it is absolutely necessary to take care of scattered orders; they are not desirous of entering the summer season with any large stocks and have been devoting their attention to cleaning up. The weather has been mild and consequently retail orders have been few. Prices have held up firmly even in the face of the slack demand but the April discount is now in effect.

The steam business is slow, although quite a few steam contracts are expiring at this time and are being renewed with considerable difficulty. Prices generally are not lower than those prevailing last year but a large part of the steam tonnage is now being purchased in the open market at rather low figures.

Lake trade is still a matter of considerable speculation. Reports from the Northwest indicate that it will be late in opening, as about 4,000,000 tons will be carried over. Boats will be plentiful and very few have been chartered for the coal trade to date. Lake prices have not been fixed.

Production in Ohio fields has been small in every locality. It is believed that with the closing of many mines, the output in the Hocking Valley is only about 20% of normal and the same is true of Jackson, Crooksville, Cambridge and Massillon. In the Pomeroy Bend field the output is also small.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.45	$1.50	.....
Inch and a quarter	1.30	1.35	$1.30
Three-quarter inch	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	0.65	0.70	0.60
Coarse slack	0.55	0.60	0.50

CINCINNATI

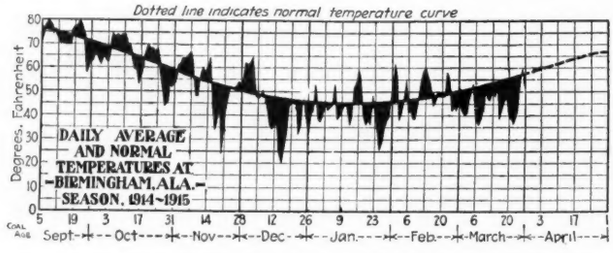
Improving industrial conditions and larger advance orders have caused a distinctly better tone. Continued over-production now the worst feature. The steam market is some stronger.

Cessation of domestic consumption and the delay in the opening up of the Lake trade have resulted in over-production, even with the mines on a restricted basis, but the steam market has been greatly improved. The large war orders, principally for machine-tools and ammunition, are having their effect and steam consumption is approaching a normal volume. In the absence of sufficient nut and slack, mine-run is being supplemented very generally. Many concerns using mechanical stokers have made arrangements to crush mine-run.

LOUISVILLE

Steam coals in active demand. Outlook on the summer stocking movement doubtful.

Steam coals continue scarce and strong, due to gradual improvement in the industrial situation, with nut and slack in the best demand at unchanged prices. It is hoped that a normal stocking business will be done in spite of the fact that during the past two winters it would have been possible for the retailers to have bought, at practically any time, at the prices they paid the operators during the early part of the season. Around $1.50 to $1.60 for the fancy coals and 65, 70 and 75c. for nut and slack of the better grades, are the prevailing prices.



COKE

CONNELLSVILLE

April furnace coke sold at good price. One large inquiry in market. Prompt coke dull. Production and shipments continue at fair rate.

The Producers Coke Co. has sold 10,000 tons of Thompson-Connellsville coke to the Eastern Steel Co. for April shipment at the reported price of $1.65 at the ovens. The contract made by the sales interest with Pickands, Mather & Co., for 10,000 to 12,000 tons a month to go to the Perry furnace at Erie, reported a week ago, likewise involved Thompson-Connellsville coke. The Pittsburgh Steel Co. is inquiring tentatively for about 20,000 tons of furnace coke for the twelvemonth beginning July 1 but negotiations are proceeding slowly as some operators are indisposed to quote for such extended delivery and none, apparently, will quote anything like the prices now ruling for prompt and second half. The prospective buyer has a contract with the Rainey interest running through June.

Prompt furnace coke continues in poor demand. Some choice brands are understood to have sold lately in a limited way at $1.65, but there is coke of fair grade available for spot shipment at about $1.50. We quote as the general market, depending on grade; Prompt furnace, $1.50@1.60; second quarter furnace, $1.60@1.65; second half furnace, $1.75; prompt foundry, $2@2.35; contract foundry, $2.20@2.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Mar. 20 at 279,442 tons, a decrease of 285 tons and shipments at 281,384 tons, an increase of 2032 tons.

Buffalo—Nothing has developed to increase the demand for coke, while it is stated that foundry coke is in increased supply, which will no doubt have some weakening effect upon prices in the near future. All grades are showing little activity. Prices remain the same at $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

Chicago—The demand for furnace and foundry cokes is light, with prices remaining unchanged. Domestic sizes show a little more activity. Quotations are as follows: Byproduct, $4.45@4.75; Connellsville, $4.65@4.80; Wise County 72-hr. (select), $4.50@4.75; gas coke, $4@4.10; furnace, $4.40@4.65.

THE STEEL INDUSTRY

War orders assuming large proportions. Domestic buying less than shipments.

Orders placed in the past two weeks with steel works in this country by European governments have exceeded those in any fortnight since the war began. An important French steel interest has just placed 100,000 tons of bars with a Lake steel works through a Central Western dealer and specifications for 45,000 metric tons of 2-in. and 3-in. rounds applying on this order are already in hand. Negotiations are pending for 30,000 tons additional. Deliveries are to be made at the rate of 25,000 tons a month.

That this country must furnish large amounts of steel first and last to France and England is daily more evident and the urgency of the need will relieve shipments on these contracts from the uncertainties of ordinary ocean transport, the governments themselves providing vessels in some cases.

In domestic business new buying in most lines has been less than shipments, production of finished material in March being the largest in months, and an excess of shipments over orders is indicated for the immediate future.—"The Iron Age."

MIDDLE WESTERN

CHICAGO

Market in a comatose condition. Steam coals still bullish but domestic sizes without snap. Production below normal.

The Western coal trade continues in the same dull condition. Complaints are general that sales are much below normal proportions, and buyers show an almost complete indifference. Contracts for screenings are being renewed, in some instances, at higher figures than last year, but a number of buyers are seemingly delaying action with the hope that after Apr. 1 they will be able to obtain concessions.

The fact that a number of Chicago municipal contracts were recently let at less than last year's prices is having a bad effect, and one or two other large contracts have been executed at slightly reduced figures. The tonnages called for by most contracts so far executed have been of about the same proportions as last season. Little progress has been made thus far in the closing of contracts for domestic sizes.

Screenings have been averaging well around the 90c. mark, reaching as high as $1.05 per ton in spots, which is the average price of mine-run.

The demand for all grades of Indiana coal is very quiet except in screenings, where the undertone is very strong due to decreased production.

Southern Illinois operators report bullish prices for screenings; the demand for domestic coal is nil, and prices for the coarse sizes at a low level.

The demand for railroad coal from the Springfield district has slightly increased the last week, and activity on screenings is pronounced. The price of fine coal has increased 10c. per ton.

There is a comparatively fair market existing for Hocking coals, and little consignment coal is being offered.

There is a surplus of eastern Kentucky coals and prices have been badly cut.

The demand for anthracite is exceedingly slow, and some anthracite from the docks has been offered in lots of 500 tons or more on a 35c. commission basis under list, but it has not had the effect of stimulating orders.

Prevailing prices are as follows:

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Carterville
Lump	$1.25@1.45	$1.25@1.35	....	$1.30@1.50	$1.40@1.65
4-in. lump	....	....	$1.40@1.65	....	....
Steam lump	1.20@1.35	1.15@1.25	1.25@1.45	1.25@1.35	....
2½-in. lump	....	....	1.35@1.45	....	....
1¼-in. lump	1.15@1.25	....	1.25@1.35	1.20@1.35	....
Mine-run	1.00@1.10	1.00@1.10	1.00@1.15	0.95@1.10	....
Egg	1.20@1.35	1.20@1.35	1.20@1.35	1.10@1.25	....
No. 1 washed	1.20@1.35	....	1.75	....	1.40@1.65
No. 2 washed	1.15@1.30	....	1.65	....	1.40@1.50
6x3-in. egg	....	....	....	....	1.50@1.75
Nut	....	1.15@1.25	1.15@1.25	1.10@1.25	....
No. 1 nut	1.15@1.35	....	....	....	....
No. 2 nut	1.10@1.25	....	....	....	....
Screenings	0.85@1.00	0.80@0.95	0.75@0.90	0.70@0.85	0.90@1.00

	Saline Co.	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump	$1.20@1.35	$1.10@1.35	$1.50@1.60	$1.50@1.60	....
1¼-in. lump	....	....	....	....	$1.25@1.35
Mine-run	1.00@1.10	1.10@1.25	0.90@1.25	1.00@1.10	1.00@1.15
Egg	....	1.00@1.10	1.40@1.60	1.50@1.60	....
No. 1 nut	1.25@1.40	....	....	....	....
No. 2 nut	1.20@1.35	....	....	....	....
Screenings	0.85@0.95	....	....	....	....

Knox and Greene County 5-in. lump, $1.25@1.35; 3-in. lump, $1.15; 5-in. egg, $1.10@1.15; 3-in. egg, $1.10@1.15; mine-run, $1@1.05; screenings, 80@90c.

ST. LOUIS

A slight change in certain directions but the general situation continues as discouraging as ever. A number of mines closed down indefinitely on Apr. 1.

As compared with conditions during the past two or three weeks, the present week was not as disappointing as anticipated. Orders from the country were a trifle more plentiful, even though the price was low, and this helped to some extent to off-set the lack of demand from the steam trade. Local retailers were kept fairly busy with continuous small orders, so that there was a light demand for domestic coal throughout the entire week.

The same applies to the 5th and 9th district, or Standard field. Even the washed market is not strong, with the exception of Nos. 3 and 4, which seem to be in demand. Mines in the southern Illinois field that have crushers are crushing their lump and egg to take care of their contracts on Nos. 2, 3 and 4.

Effective the first of April, several mines in both the high grade and the Standard district will shut down for an indefinite period, until market conditions are better.

During the past week a little anthracite has moved in at the April circular, and a fairly good tonnage has been placed for April, but not in the same volume as in past years. There is very little doing in smokeless.

PORTLAND, ORE.

Warmer weather causes falling off in demand for domestic coal and business is quiet.

Warmer weather set in here this week and the dullness of spring is evident in the coal business. Until lower prices are put into effect to induce buying for storage for the next winter, this will undoubtedly continue. The summer prices will probably go into effect this month.

PRODUCTION AND TRANSPORTATION STATISTICS

BITUMINOUS COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during November and the first twelve months of the last two years, in short tons:

	December		12 Months	
Anthracite	1913	1914	1913	1914
Baltimore & Ohio[1]	118,264	126,240	1,516,916	1,371,563
Chesapeake & Ohio[1]	681	1,082	16,545	16,728
Erie[2]	794,562	787,401	8,811,114	9,274,401
Pennsylvania[1 3]	1,012,125	977,929	10,711,335	11,201,150
Virginian[2 1]	86	261	1,045	745
Total 5 roads	1,925,718	1,892,913	21,056,955	21,864,587
Bituminous				
Baltimore & Ohio[1]	3,183,145	2,367,719	36,915,385	32,554,359
Buffalo, Roch. & P.[1 2]	816,981	683,440	9,723,992	8,059,756
Buffalo & Susq.[1 2]	141,895	121,728	1,787,551	1,190,181
Chesapeake & Ohio[1]	1,438,367	1,501,086	17,155,233	20,663,520
Erie[3]	10,389	3,921	350,590	75,818
Hunt. & Br'd T. Mt.[1 2]	110,411	97,219	1,352,721	1,036,658
New York Central[3]	806,572	757,140	9,220,689	8,120,210
Norfolk & Western[1 2]	1,835,823	1,641,165	23,892,469	25,471,969
Pennsylvania[1 3]	4,354,729	3,755,675	51,526,267	47,769,227
Pitts. & Lake Erie[1 2]	869,360	624,932	12,783,389	10,703,478
Pitts. Shaw. & North[1 2]	264,145	234,734	2,799,308	2,359,807
Virginian[1 2]	364,937	276,015	4,555,331	3,954,310
Western Maryland	309,833	258,891	3,383,697	3,069,708
Total 13 roads	14,506,587	12,323,665	175,446,622	165,029,001
Coke				
Baltimore & Ohio[1]	269,998	232,594	4,610,796	3,202,381
Buffalo, Roch. & P[1 2]	27,559	33,553	500,230	302,996
Buffalo & Susq.[1 2]	23,351	48,869	301,475	447,354
Chesapeake & Ohio[1]	33,679	11,207	361,535	298,632
New York Central[3]	.....	.....	36,207	.....
Norfolk & Western[1 2]	117,305	73,075	1,530,384	1,018,611
Pennsylvania[1 3]	880,962	621,774	12,892,825	9,548,354
Pitts. & Lake Erie[1 2]	470,912	297,052	6,710,138	4,839,185
Pitts. Shaw. & North[1 2]	.....	.....	9,383	.....
Western Maryland	4,801	2,658	73,344	59,646
Total 10 roads	1,827,967	1,320,782	28,026,317	19,717,159

Total Coal and Coke 13 Roads	1913	1914
January	19,314,523	18,157,998
February	17,594,079	15,446,830
March	17,672,305	20,233,213
April	16,882,326	15,497,444
May	19,015,721	16,523,385
June	18,610,757	16,984,476
July	18,736,979	17,589,427
August	19,757,104	18,740,453
September	19,080,318	18,601,926
October	20,646,424	17,802,496
November	18,959,086	15,495,739
December	18,260,272	15,537,360
Total 12 months	224,529,894	206,610,747

[1] Includes coal received from connecting lines.
[2] Includes company's coal.
[3] Does not include company's coal hauled free.

Note:—The Southern Railway hauled 282,881 short tons of bituminous coal during November, 1914, and 3,607,584 short tons during the eleven months ending Nov. 30, 1914.

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during February and the previous two months:

	December		January		February	
	1914	1913	1915	1914	1915	1914
Coal	2,227,899	3,005,914	2,293,406	2,917,834	1,906,210	2,385,243
Coke	232,594	269,998	221,395	274,955	232,111	265,380
Total	2,460,493	3,275,912	2,514,801	3,192,789	2,138,321	2,650,623

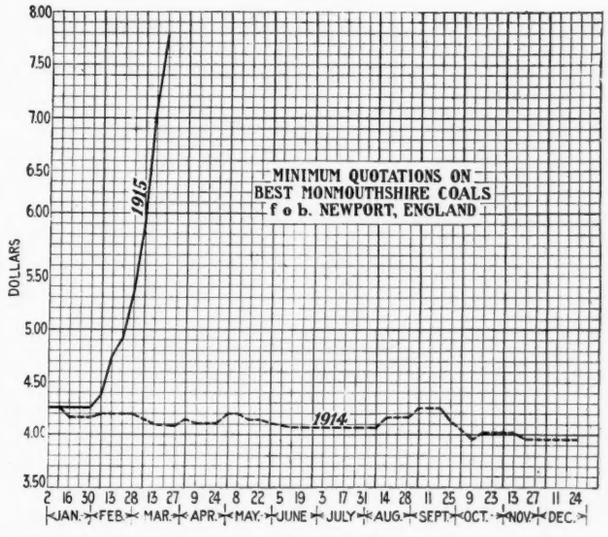
FOREIGN MARKETS

GREAT BRITAIN

Unsettlement in labor circles still the predominating feature of the coal market. House coals a trifle easier.

London, Mar. 19—Labor difficulties still loom large in the coal mining industry, and are engaging a great deal of attention which might be devoted to meeting the needs of the country in the present crisis. It is to be regretted that the Welsh miners have rejected the offer made by the coal owners, and at the special conference of the Miners' Federation of Great Britain held in London on Wednesday it was resolved to demand a general increase in wages to the extent of no less than 20 per cent. in view of the increased cost of living. The provisional agreement arrived at by the Conciliation Board for England and North Wales has been accepted by the men, and that difficulty is out of the way perhaps, but at present interest is naturally centered upon the demand for an immediate advance in wages all round, which may be considered apparently by a joint conference of employers and employed which the Mining Association of Great Britain has been requested to convene.

Despite the possibility of a higher wages bill, the market has been a little easier during the week so far as house coal is concerned, but most other kinds are firmly maintained at their former level, while in some cases further advances are reported.—"The Iron & Coal Trade Review."



Mar. 19—There is not much alteration in the general conditions. Tightness is fully maintained for all qualities, the production being still limited, while the demand is as heavy as ever. Quotations are approximately as follows:

Best Welsh steam	Nominal	Best Monmouthshires	$7.68@7.92
Best seconds	$7.92@8.16	Seconds	7.44@7.68
Seconds	7.68@7.92	Best Cardiff smalls	4.92@5.16
Best dry coals	7.20@7.68	Cargo smalls	4.32@4.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport both net, exclusive of wharfage.

Freights—Business is still very quiet. In most directions rates have sharply declined due to shortage of coal and the dearth of stems. Rates are approximately as follows:

Gibraltar	$5.04	Naples	$6.48	Las Palmas	$5.04
Malta	....	Venic., Ancona	9.60	St. Vincent	5.28
Marseilles	5.60	Alexandria	7.20	Rio Janeiro	7.44
Algiers	5.40	Port Said	6.72	Monte Video	6.72
Genoa	6.24			River Plate	6.96

Note—These quotations are based on an exchange rate of 24c. to one shilling.

Coal Contracts Pending

Contracts listed in this department are authoritative in every respect except where the source of information is questionable, in which event it is noted. All contracts are listed promptly on receipt and only repeated when additional information becomes available or in the last issue previous to the day on which bids will be closed. Liberal remuneration will be paid for all legitimate notices of this kind sent in.

+Indicates contracts regarding which official information has been received.

+No. 96—Farmington, Mo.—The Municipal Electric Light & Water Plant will be in the market during the current month for about 200 tons of 1½- to 2-in. screenings (p. 356). The usual contract price is $1.90 f.o.b. railroad station, Farmington. Address Supt. C. M. Thomsen, Municipal Electric Light & Water Plant, Farmington.

No. 97—Baltimore, Md.—According to recent press reports, this contract (p. 356), which provides for furnishing about 210,000 tons of soft coal to the Merchants' and Miners' Transportation Co., has been awarded. The Baker-Whiteley Coal Co., Shaw Bros., and Coale & Co., received a large portion of the Baltimore supply, and part of the Philadelphia supply, and W. H. Bradford, Philadelphia, received a large part of the Philadelphia business. It is understood that the supply for Newport News went to several out-of-town concerns. Address Pur. Agt. and Gen. Mgr. W. P. Coria, Merchants' and Miners' Transportation Co., Baltimore, Md.

No. 107—New York, N. Y.—The New York & Baltimore Transportation Co. purchases about 60,000 tons of soft coal per year (p. 357). This contract will be let during the current month. Address Pur. Agt. B. R. Roome, Pier 10, East River, New York, N. Y.

No. 110—Baltimore, Md.—The Maryland Biscuit Co., Baltimore, purchases 1200 tons of bituminous coal per year (p. 357). This company lets its contract during the current month. Address Pur. Agt. W. C. Scott, Maryland Biscuit Co., Baltimore, Md.

No. 112—Baltimore, Md.—The Coca-Cola Co. will award a contract during the current month for a supply of good grade steam coal (p. 357). Address Pur. Agt. William Martien, 3 Calvert St., Baltimore Md.

No. 114—Baltimore, Md.—Wise Bros. will soon be in the market for a supply of standard grade mine-run coal, the present contract expiring this month (p. 357). Address Pur. Agt. and Supt. L. A. Hazzard, Wise Bros., Baltimore, Md.

No. 116—Baltimore, Md.—Stewart & Co., of this city, consumes about 200 tons of Georges Creek coal per month (p. 357). The present contract expires this month, and is awarded on a competitive basis. Bids are received by J. Middleton. Address Pur. Agt. Geo. R. Russell, Baltimore, Md.

No. 117—Boston, Mass.—The Stone & Webster Co. will be in the market this month for 50,000 tons of New River and Pocahontas mine-run coal, deliveries to be made in proportionate amounts each month at Tidewater, Boston (p. 357). Address R. E. Hamilton, 147 Milk St., Boston, Mass.

No. 123—Baltimore, Md.—The G. B. S. Brewing Co. consumes about 10,000 tons of standard mine-run coal per year. The present contract expires this month (p. 357). Address M. L. G. Fesenmeier, care of the G. B. S. Brewing Co., Baltimore, Md.

+No. 143—Buffalo, N. Y.—The lowest bids submitted on this contract (p. 398), which provides for furnishing the annual supply of anthracite and bituminous coal for the schools and other buildings were as follows: C. A. & M. Kaiser, bituminous: Mine-run, $2.65; screened nut, $2.60; slack, $2.45; screenings, $2.15; smokeless, $2.70. Connell Anthracite Mining Co. quoted on anthracite as follows: Grate, $5.10; egg, $5.30; pea, $4.25. Address Comr, of Public Works, Col. Francis G. Ward, Buffalo, N. Y.

No. 165—Stamford, Conn.—Beck & Co. will contract for 2500 tons of bituminous coal about Apr. 7 (p. 399). Address Pur. Agt. George F. Leeming, 206 West 29th St., New York, N. Y.

+No. 205—Norristown, Penn.—The local Board of Education will be in the market this month for 165 tons of anthracite, egg and stove coal each, 225 tons of pea, and 150 tons of bituminous coal (p. 400). Address Sec. Harry W. Akins, 717 DeKalb St., Norristown, Penn.

+No. 206—Woonsocket, R. I.—The local school board will be in the market some time this month for about 1000 tons of the best Lehigh and Scranton coal (p. 400). Address Chn. of Comn. on Supplies, T. Guerin, care of Alsace Worsted Co., Woonsocket, R. I.

+No. 225—Madison, Wis.—The Board of Education of this place will be in the market this month or next for about 500 tons of anthracite pea and Pocahontas coal (p. 446). Address Chief Clk., Board of Education, Madison, Wis.

+No. 268—Buffalo, N. Y.—On this contract (p. 448), which provides for furnishing anthracite and bituminous coal as required by the Police Department during the year beginning Apr. 10, the Buffalo Fuel Co. submitted the lowest bid. Address Board of Police Commissioners, Headquarters Bldg., Franklin and Seneca St., Buffalo, N. Y.

+No. 282—Meriden, Conn.—The School Board here will place a contract for about 800 tons of anthracite coal this month (p. 448). Address Chairman of Committee on Buildings, School Department, Meriden, Conn.

+No. 298—Clarendon, Ark.—The Clarendon Electric Light & Ice Co. will be in the market this month for about 2400 tons of pea and slack coal (p. 488). Address Cont. Agt. J. T. Bateman, Clarendon Electric Light & Ice Co., Clarendon, Ark.

+No. 305—Atlantic, Iowa—The Municipal Electric Light Works will contract this month for about 4300 tons of Iowa steam coal (p. 488). Address Mgr. T. E. Nichols, Municipal Electric Light Works, Atlantic, Iowa.

+No. 306—Algoma, Wis.—The City Water & Light plant will be in the market this month for a supply of mine-run Youghiogheny coal (p. 488). Address Supt. J. O. Posson, City Water & Light Plant, Algoma, Wis.

+No. 311—Chaska, Minn.—The Municipal Electric Light & Power Plant of this place will be in the market this month for approximately 800 tons of coal (p. 488). Address Mgr. & Supt. E. F. Strong, Municipal Electric Light & Power Plant, Chaska, Minn.

+No. 316—Wyandotte, Mich.—The Municipal Light & Water Plant will be in the market this month for 5000 tons of West Virginia mine-run coal (p. 488). Address Supt. A. S. McClenehan Municipal Light & Water Plant, Wyandotte, Mich.

+No. 320—Clarion, Iowa—The Clarion Light Plant will be in the market this month for 1000 tons of ¾-in. Christopher Illinois screenings (p. 527). Address G. Mack, Clarion Light Plant, Clarion, Iowa.

No. 349—Baltimore, Md.—The National Enameling & Stamping Co. advises that it is not in the market for coal as stated in our previous issue (p. 566). Address Pur. Agt. R. D. Samuels, 305 Fifth Ave., New York, N. Y.

No. 371—Alexandria, Ind.—This contract (p. 567) provides for a supply of mine-run coal for the Alexandria Paper Co., and not the Alexander Paper Co., as stated in our last issue. Address the Alexandria Paper Co., Alexandria, Ind.

NEW BUSINESS

+No. 432—Minneapolis, Minn.—The Board of Education at this place will be in the market during April or June for about 15,000 tons of bituminous and semibituminous coal. This includes the annual supply, and the contract is awarded on the B.t.u. basis. Address Business Agt. F. E. Reidhead, Board of Education, 407 City Hall, Minneapolis, Minn.

+No. 433—Reading, Penn.—The Board of Education at this place will be in the market during April or May for approximately 2500 tons of pea, egg and stove coal. This contract is usually let to local dealers. Address Secy. F. Roland, Jr., Board of School Directors, Reading, Penn.

No. 434—Adams, Mass.—The Renfrew Mfg. Co. will be in the market for 4000 to 6000 tons of anthracite and bituminous coal about May 1, delivery via B. & A. R.R. Address Treasurer, Renfrew Co., Adams, Mass.

+No. 435—Gloversville, N. Y.—The Board of Education at this place will purchase about 800 tons of egg coal during May or April. The present contract was closed at $6.60 per ton, and was awarded to a local company. Address Supply Committee, Board of Education, Gloversville, N. Y.

+No. 436—West Point, N. Y.—Sealed proposals in triplicate will be received until 2 p.m., Apr. 26, for furnishing anthracite coal required at the U. S. Military Academy during

the fiscal year ending June 30, 1916. Address Quartermaster, U. S. Military Academy, West Point, N. Y.

+No. 437—Boston, Mass.—Sealed proposals will be received until 2 p.m., Apr. 14, for furnishing 2000 tons of anthracite coal and 1300 tons of bituminous coal to the Post Office and Sub-Treasury building during the fiscal year ending June 30, 1916. Address Custodian William F. Murray, U. S. Post office and Sub-Treasury, Boston, Mass.

+No. 438—Fort Reno, Okla.—Sealed proposals will be received until noon, Apr. 22, for furnishing domestic and steam coal as required during the fiscal year, commencing July 1, 1915. Address Depot Quartermaster, Fort Reno, Okla.

+No. 439—Fort Sam Houston, Tex.—Sealed proposals will be received until 11 a.m., Apr. 15, for furnishing charcoal and smithing coal, as required at the Southern Department posts during the fiscal year commencing July 1, 1915. Address Depot Quartermaster G. S. Bingham, Fort Sam Houston, Tex.

No. 440—Chicago, Ill.—The American Compound Door Co. will be in the market about Apr. 20 for a month's supply of Franklin County, Illinois, No. 2 nut coal. This company consumes from 350 to 400 tons per month. Address the Purchasing Agent, American Compound Door Co., Chicago, Ill.

+No. 441—Garfield, N. J.—The Standard Oil Co. at this place is in the market for 2000 tons No. 1 buckwheat, deliveries to be made over the next year. Address Coal Pur. Agt. J. L. Hutchinson, 26 Broadway, New York City.

+No. 442—Minot, N. D.—Sealed bids will be received until 2 p.m., Apr. 5, for furnishing coal to Ward County for the ensuing year. Address County Audr. L. J. Thompson, Minot, N. D.

+No. 443—Troy, N. Y.—Sealed proposals were received until 11 a.m., Apr. 2, for furnishing and delivering anthracite coal to the various city buildings and charities, for the season of 1915-16. Address Secy. John J. McLaughlin, Board of Contract and Supply, Room 21, City Hall, Troy, N. Y.

+No. 444—Kalamazoo, Mich.—The Board of Education is in the market for about 3500 tons of Pocahontas mine-run coal and bituminous No. 2 gas coal. Address the Secretary, Board of Education, 207 Majestic Bldg., Kalamazoo, Mich.

+No. 445—National Soldiers' Home, Tenn.—Sealed proposals will be received until 2 p.m., Apr. 19, for furnishing and delivering 10,500 tons of bituminous coal to the National Soldiers' Home, Mountain Branch, N. H. D. V. S. Delivery is to be made according to instructions. Address Treas. Oliver K. Marshall, Mountain Branch, N. H. D. V. S. National Soldiers' Home, Tenn.

No. 446—Buffalo, N. Y.—The Larkin Co. at this place is in the market for a supply of slack coal, contract to go into effect Apr. 1, and the amount required being from 100 to 150 tons per day. Address Purchasing Agent, Larkin Co., Buffalo, N. Y.

No. 447—Alexandria, Ind.—The General Ins. & Mfg. Co. is erecting a plant at this place, and it is understood that they will be in the market for coal about Apr. 1. Address General Ins. & Mfg. Co., Alexandria, Ind.

+No. 448—Springfield, Mass.—Sealed proposals will be received until 10 a.m., Apr. 15, for furnishing coal to the armory for the fiscal year commencing July 1, 1915, and ending June 30, 1916. During the fiscal year ending June 30, 1915, 65,000 lb. of egg and 110,000 lb. of nut coal were used. Address Depot Quartermaster, Springfield Armory, Springfield, Mass.

+No. 449—Fort Wayne, Ind.—Sealed proposals will be received until 5 p.m., Apr. 9, for furnishing and delivering to the different engine houses, 165 tons of nut coal, 64 tons of egg coal, and 17 tons No. 4 stove coal. Address Clk. D. C. McCarthy, Board of Public Safety, Fort Wayne, Ind.

+No. 450—Braddock, Penn.—Sealed bids will be received until 7:30 p.m., Apr. 4, for supplying the Braddock Water Works with the best steam mine-run coal for one year, beginning Apr. 1, 1915. The amount required is about 125 tons per week, to be delivered as specified by the Water Commissioner, at water works siding of the P., McK. & Y. R.R. Bidders are to state from which mine coal is to be supplied, and bond of $1000 is required. Address Secy. L. L. Todd, Braddock, Penn.

No. 451—Chicago, Ill.—The American Sand & Gravel Co. will purchase throughout the coming year about 100 cars of Illinois or Indiana lump coal. The first purchase will be made about Apr. 15. Address Gen. Mgr. Fisher, American Sand & Gravel Co., Chicago, Ill.

+No. 452—San Francisco, Calif.—Sealed proposals will be received until 10 a.m., Apr. 15, for furnishing bituminous mine-run coal for steaming purposes for the army transports, also screened bituminous coal for the National Cemetery and Recruiting Office. Address Depot Quartermaster Lieut. Col. W. H. Hart, 1086 North Point St., San Francisco, Calif.

+No. 453—Fort Keogh, Mont.—Sealed proposals will be received until 11 a.m., Apr. 26, for furnishing 600 tons of lump coal and 150 tons of pile-run coal, at the Fort Keogh Remount Depot, Mont. The storage capacity is 400 tons lump and 150 tons pile-run. The siding of the N. P. Ry., also the siding of the C. M. & St. P. Ry. Co., permit direct unloading into storage shed. Address Depot Quartermaster Capt. Sam. Van Leer, Fort Keogh Remount Depot, Mont.

No. 454—Cleveland, Ohio—The Municipal Electric Light Dept. will be in the market about Apr. 1 for from 35,000 to 40,000 tons of Youghiogheny coal. The present contract was closed at $1.70 per ton. Address Supt. of Service and Distribution C. G. Beckwith, Municipal Electric Light Dept., Cleveland, Ohio.

+No. 455—Clinton, Mass.—Sealed bids were received up to noon, Mar. 30, for supplying the School Department with coal. Address Frederick E. Clerk, Clinton School Committee, Clinton, Mass.

+No. 456—Dell Rapids, S. D.—Sealed bids will be received until noon, Apr. 6, for furnishing 500 tons of Youghiogheny coal to the city, for the year commencing Apr. 1. Delivery is to be made as required. Address City Audr. James Ridlington, Dell Rapids, S. D.

+No. 457—Belle Fourche, S. D.—Bids will be received until noon, Apr. 6, for furnishing egg, lump, and mine-run coal to the County Court House and Jail. Address County Audr. N. P. Lang, Belle Fourche, S. D.

No. 458—Baltimore, Md.—Press reports state that bids will soon be received for furnishing about 25,000 tons of bituminous coal for the Maryland penitentiary, House of Correction at Jessups, the State Sanitarium at Sabillasville, and the Maryland Agricultural College at College Park. Samples are to be analyzed by the United States Bureau of Mines. Bids are to be submitted separately on each contract or one bid is to be made on all contracts.

No. 459—Chicago, Ill.—The American Cocoa Butter Co. will be in the market about July 1 for a supply of Indiana mine-run coal, the contract to cover a period of one year. This company uses about 200 tons per month. Address the Purchasing Agent, American Cocoa Butter Co., Chicago, Ill.

+No. 460—Belvidere, Ill.—The Board of Education at this place will be in the market during July for about 300 tons of Winifred Splint and Pocahontas coal. Address Secy. R. B. Andrews, Board of Education, Belvidere, Ill.

+No. 461—Boston, Mass.—Sealed bids will be received until noon, Apr. 7, for furnishing and delivering about 41,300 gross tons of coal, as follows:

PLAN NO. 1—For big vein Georges Creek Cumberland coal, mined in Maryland, or best quality Pocahontas or New River.

PLAN NO. 2—Or for any good steaming coal, to be paid for on a valuation basis, to be delivered as follows: About 800 tons in bins of Children's Institutions Dept., Suffolk School, Rainsford Island; about 6000 tons in bins of Infirmary Dept., Almshouse and Hospital, Long Island; about 11,000 tons in bins for Ferry Service; about 8000 tons in bins of the Calf Pasture Pumping Stations, Sewer Division; about 6500 tons alongside Penal Institutions Dept., Deer Island; about 9000 tons in bins to the City Hospital, deliveries as required by the Superintendent. Address Supt. of Supplies D. Frank Doherty, Room 808, City Hall Annex, Boston, Mass.

No. 462—Rochester, Ind.—The Rochester Electric Light, Heat & Power Co., at this place, will soon be in the market for approximately 7000 tons of Indiana mine-run, or coal of equal quality. Address Mgr. Charles Davis, Rochester Electric Light, Heat & Power Co., Rochester, Ind.

No. 463—LaFayette, Ind.—The Wabash Valley Coal Co. is in the market for a supply of Indiana 1¼-in. and 4-in. lump coal and also a supply of egg coal. Address Secy. P. F. Freel, Wabash Valley Coal Co., LaFayette, Ind.

No. 464—Boston, Mass.—Bids will be received about May 1 for furnishing about 3500 tons of anthracite coal, furnace size, to the State House. Delivery is to be made as required. Address Sargeant-at-Arms Thomas F. Pedrick, State House, Boston, Mass.

+No. 465—St. Louis, Mo.—The Board of Education here will be in the market during May for about 30,000 tons of bituminous coal and 700 tons of anthracite. Pennsylvania anthracite best quality coal, in stove and chestnut sizes, and standard Illinois bituminous screened coal is required. The present contract was closed as follows: Stove, $7.60; chestnut, $7.85; bituminous, $1.77¼. Address Supply Comr. E. M. Brown, 3431 School St., St. Louis, Mo.

+No. 466—Reading, Penn.—Sealed proposals will be received until 10 a.m., Apr. 14, for furnishing 400 tons of pea coal and 50 tons of stove coal to the Berks County Prison. Coal is to be freshly mined and is to be either Schuylkill Valley or Lorberry red ash. Address County Controller D. K. Hoch, County Controller's Office, Reading, Penn.

+No. 467—Somerset, Penn.—Sealed proposals will be received until 1 p.m., Apr. 6, for furnishing coal at the Water Works, Pumping Station, and Municipal Building. Address Secy. C. E. Pile, Town Council, Somerset, Penn.

+No. 468—Constable Hook (Bayonne), N. J.—The Standard Oil Co. will receive bids for anthracite coal for delivery at this point. The tonnages involved are 13,000 tons of pea coal and 6000 tons of No. 1 buckwheat. The contract will be closed this month. Address, Coal Pur. Agt. J. L. Hutchinson, Standard Oil Co., 26 Broadway, New York City.

No. 469—Chicago, Ill.—The American Hide & Leather Co. will be in the market about June 15 for a supply of Illinois or Indiana screenings and Illinois or Indiana mine-run coal. This company uses from 400 to 500 tons of screenings per month and two cars of mine-run coal. This contract is to cover a period of one year. Address Assist. Pur. Agt. Mr. Bruno, American Hide & Leather Co., Chicago, Ill.

+470—Batavia, Ohio—Sealed bids were received until noon, Mar. 26, for furnishing genuine Thacker mine-run coal or Pocahontas mine-run coal, for operating and running the waterworks and electric light plant at Batavia. Address Secy. Thomas Glancy, Board of Public Affairs, Batavia, Ohio.

No. 471—Chicago, Ill.—Spielman Bros. Co. contract about Apr. 1 for approximately 4000 tons of egg or mine-run coal, the present supply coming from southern Illinois. Address Pur. Agt. Geo. W. Raithel, Spielman Bros. Co., Kingsbury and North Ave., Chicago, Ill.

No. 472—Traverse City, Mich.—Bids were received on Mar. 30 for furnishing the City Water Works, a supply of mine-run, lump or slack coal. The works consume from six to seven carloads per annum, and delivery is made via the G. R. & I. R.R., or the Pere Marquette R.R. Address City Clk. W. H. Nash, Traverse City, Mich.

+No. 473—Portland, Ore.—Sealed proposals will be received until Apr. 20, for furnishing the steam and lump coal required at Portland and Astoria, Ore., and Seattle, Wash., for vessels and stations of the 16th and 17th lighthouse during the fiscal year ending June 30, 1916. Address Lighthouse Inspector, Portland, Ore.

+No. 474—Niagara Falls, N. Y.—Sealed bids were received until 8 p.m., Mar. 29, for furnishing 1500 tons of anthracite coal in grate, egg, stove, chestnut and pea sizes, to be delivered to the various school buildings in the city. About 1260 tons is for immediate delivery and the balance as directed. Address Clk. J. B Kelley. Supply Committee, Board of Education, Niagara Falls, N. Y.

+No. 475—Rock Island, Ill.—Sealed proposals will be received until 11 a.m., Apr. 15, for furnishing fuel to the Arsenal for the fiscal year commencing July 1. Address Lieut.-Col. Kenneth Morton, Rock Island Arsenal, Ill.

+No. 476—Jeffersonville, Ind.—Sealed proposals in triplicate will be received until 10 a.m., Apr. 21, for furnishing about 1,000,000 lb. of bituminous coal to the Jeffersonville depot during the period commencing July 1, 1915, and ending June 30, 1916. Address Maj. Joseph T. Davidson, Jeffersonville, Ind.

No. 477—Chicago, Ill.—The American Asphalt Paving Co. at this place will be in the market about May 1 for approximately 4000 tons of No. 3 washed or raw Illinois or Indiana nut coal. Address Purchasing Agent, American Asphalt Paving Co., 133 West Washington St., Chicago, Ill.

+No. 478—Newfoundland, N. J.—The Standard Oil Co. at this place is in the market for 3000 tons of No. 1 buckwheat, delivery to be made via New York, Susquehanna & Western. Address Coal Pur. Agt. J. L. Hutchinson, Standard Oil Co., 26 Broadway, New York City.

No. 479—Jersey City, N. J.—The Public Service Gas Co. is in the market for 25,000 tons of coal, to be delivered during the period beginning Apr. 1, 1915, and ending Mar. 31, 1916. Deliveries are required alongside the Gas Company's dock on the Hackensack River, West End Works, Jersey City. Address Pur. Agt. J. A. Pearson, Public Service Gas Co., Broad and Arch Sts., Philadelphia, Penn.

+No. 480—Toronto, Ont., Can.—The University of Toronto is in the market for about 8000 tons of bituminous slack coal and 2000 tons of anthracite grate, stove and nut sizes, deliveries to be made some time after July. At present, tests are being made of various kinds of coal for the central heating plant of the University. Address Superintendent, the University of Toronto, Toronto, Ontario, Can.

+No. 481—Toronto, Ont., Can.—The City Property Department will soon be in the market for 3500 tons of anthracite, 500 tons of bituminous coal and 2000 tons of slack coal. Address Property Comr. Daniel Chisholm, Toronto, Ont., Can.

No. 482—Louisville, Ky.—The Kentucky Wagon Mfg. Co. is testing various grades of coal in order to find the variety that is best adapted to its needs. This company consumes about 8000 tons per year, and usually contracts during January for its supply. Although the present contract has been let, it is understood that the supply does not come up to the requirements of the company and there is a probability of a change being made. Address Pres. R. V. Board, Kentucky Wagon Mfg. Co., Louisville, Ky.

No. 483—Chicago, Ill.—The Hartman-Sanders Co. will soon be in the market for about 25,000 tons of 2-in. southern Illinois screenings, or some coal of equal quality. Address Pres. A. P. Weidner, Hartman-Sanders Co., 2155 Elston Ave., Chicago, Ill.

No. 484—Holland, Mich.—The present contract of the Holland-American Sugar Co. for 20,000 tons of slack and 3500 tons of lump coal expires on Apr. 30. This coal comes from West Virginia mines. Address Pur. Agt. C. M. McLean, Holland-American Sugar Co., Holland, Mich.

No. 485—Chicago, Ill.—The Art Bedstead Co. at this place will be in the market about May 1 for several cars of No. 2 southern Illinois washed nut coal. This company purchases about 1200 tons of this grade during the year. Address Gen. Mgr. F. W. Adams, Art Bedstead Co., Chicago, Ill.

CONTRACTS AWARDED

Note—Successful bidders are noted in **bold face** type.

No. 285—Lynchburg, Va.—This contract (p. 187), which provides for furnishing approximately 800 tons of coal, has been awarded to **Diuguid Bros.**, at $3.25 for mine-run coal and $6.90 for Pennsylvania anthracite. Address City Clk. J. M. Otey, Board of Education, Lynchburg, Va.

+No. 296—Leavenworth, Kan.—This contract (pp. 488 and 566) has been awarded to the **Carr Coal Mining & Mfg. Co.** for furnishing screen lump coal at $2.10 per half-ton lots and $3.90 per ton lots. Address County Clk. J. E. Voorhees, County Clerk's Office, Leavenworth, Kan.

+No. 334—Jersey City, N. J.—This contract (p. 566), which provides for furnishing anthracite coal to the various public school buildings, has been awarded to the **E. L. Young Co.**, 507 Grand St., Jersey City. Address Secretary, Board of Education, Jersey City, N. J.

+No. 344—Attleboro, Mass.—This contract (p. 528), which provides for furnishing and delivering 450 tons of bituminous coal, has been awarded to the **Eastern Coal Co.**, Providence, R. I., at $4.90 per ton. Address Supt. of Pub. Wks. H. J. Goodale, Room 9, Sturdy Block, Attleboro, Mass.

CONTRACT NOTES

The high cost of coal to the Boston & Maine was responsible for the deficit which this company shows. Five representative Eastern carriers are perhaps the New York Central, the Pennsylvania lines, East and West, Baltimore & Ohio, and Erie, and these roads, together pay on an average of $1.48 per ton for their fuel at the points of distribution on their lines, as compared with $2.86 thus paid by the Boston & Maine. Although many of the transportation rates now in operation on the Boston & Maine (for example, its passenger fare basis of practically 2½c. per mile) are no higher than rates on other enumerated lines. The Boston & Maine, if it could last year have gotten the fuel consumed by its locomotives at the average cost of $1.48 per ton, it could have showed earnings $2,245,225 higher than they were, the equivalent of 5.7% on common and preferred stock.—"The Boston News Bureau."

Portland's consumption of coal during the year 1914, that is, coal sold by dealers, was about 100,000 tons, which is a little under the normal consumption on account of mild weather. In this district wood and oil fuel figure prominently; it has been estimated that if all the fuel used here were coal it would amount to 1,000,000 tons. It is believed, therefore, that increased shipping facilities and reduced prices will mean a large increase in the consumption of coal here in the future.

One of the commercial attaches of the Department of Commerce in a neutral European country reports that buyers of American coal there desire specific terms and information relative to deliveries, quality, etc. Quotations should be made c.i.f. port of delivery.

An American consular officer in South America has been requested to assist in securing connections with a firm in the United States which is prepared to sell and deliver gas coal. It is stated that the inquirer uses about 7000 tons per year.